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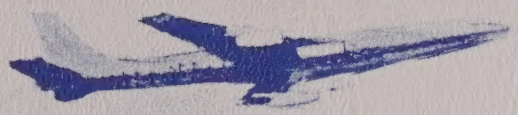

MAINTENANCE MANUAL
for
RADIO FREQUENCY MODULE
MODEL RFM-10D
(For use with the Model FM-10C Mainframe)
Manual No. 1-500783-292
(For use with Serial Numbers 101 and above.)

RFM-10D

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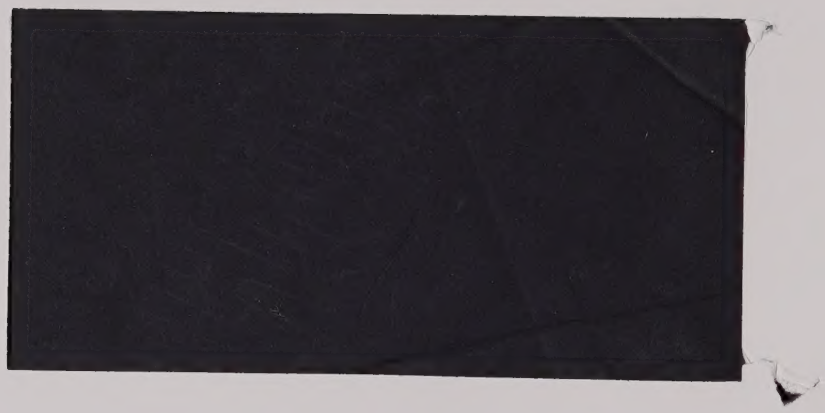

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(For use with Serial Numbers 101 and above.)

This manual refers directly to serial numbers 201 and above.
Appendix A, Manual Backdating Information, adapts this manual to serial numbers 101 thru 200.
For operating instructions refer to Model FM-10C Operator's Manual No. 1-500783-258 (Rev B) or later.

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1. Model or Type
2. Serial Number
3. Description of trouble(1)
4. Approximate date instrument was placed in operation.
5. Approximate number of hours in use.
6. Has maintenance action been previously requested.
7. Other comments.

(1) Include data on symptoms, measurements taken, suspected location of trouble, maintenance action taken and any other relevant data.

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Section I
THEORY OF OPERATION

1.1 INTRODUCTION

This section consists of the circuit description of the Model RFM-10D plug-in module. The information is presented to assist the user in the troubleshooting and maintenance of the instrument. Refer to the Detailed Block Diagram, Figure 1-1, and the Schematic Diagrams, Figures 4-1 thru 4-5.

1.2 GENERAL

The Model RFM-10D plug-in module derives its power supply and RF signal inputs via the rear connectors, P2 and P1. The instrument is energized whenever the Mainframe is operating.

Four major assemblies are contained in this unit: Broadband Amplifier Assembly, A1A2; 11 MHz IF Assembly, A1A3; Broadband Amplifier/Mixer/Detector Assembly, A1A4, and Diode Switch Assembly, A1A6. The circuitry of the Model RFM-10D will be explained according to the functions of the Mainframe MODE switch: GEN, MEAS, GEN MOD CAL, and TONE GEN.

1.3 DETAILED THEORY

1.3.1 Generate Circuitry (Mainframe MODE switch set to GEN)

The Mainframe synthesizer output enters the Model RFM-10D module via connector, P1, and is amplified by the 39 dB broadband amplifier, A1A4Q1 thru A1A4Q8. Level detector diode, A1A4CR1, rectifies this signal and returns a dc level proportional to the RF level to the AGC amplifier in the Mainframe via connector, P2-3, for automatic leveling.

The output of the 39 dB broadband amplifier is also brought to the RF OUTPUT receptacle J1, through a 110 dB attenuator, AT1, and an RF fuse, F1.

Diode switches A1A6CR2 thru A1A6CR5 are in the (gen) position and prevent the BBA signal from being radiated through the MEASURE INPUT receptacle, J2.

1.3.2 Measure Circuitry (Mainframe MODE switch set to MEAS)

The unknown signal enters the instrument via the MEASURE INPUT receptacle, J2. The diode switches on assembly A1A6 are in the (meas) position and allow the signal to pass to A1A2. The 20 dB Broadband Amplifier, A1A2, is energized and passes the signal to the mixer, A1A4Z1-X.

The Mainframe Frequency switches and 0-100 Hz control are adjusted for zero beat. At this time the frequency at the synthesizer input connector, P1, is 11 MHz higher than the Frequency switch positions. This frequency is amplified by the 39 dB BBA and applied to the 4 dB BBA, A1A4Q9. The 40 dB pad is bypassed by diode switch, A1A4CR3, and the transistor switch, A1A4Q10, removes the 50 ohm load, A1A4R34, from the circuit. The output of the 4 dB BBA is applied to mixer, A1A4Z1-L, and the difference frequency (11 MHz) from A1A4Z1-R is applied to the 11 MHz bandpass filter on the A1A3 assembly. Diode switches, A1A3CR3 thru A1A3CR6, are utilized to switch the 30 kHz crystal filter, A1A3FL1, in or out of the circuit and are operated by the MEASURE MODE BANDWIDTH switch, S2. In the narrow bandwidth (30 kHz), NARROW lamp, DS1, lights. The bandwidth in the WIDE position is approximately 200 kHz. After the diode switch, the signal is amplified by amplifier, A1A3Q6, which is tuned to 11 MHz, and applied to mixer, A1A3U1.

9 MHz from the Mainframe is applied to the other input port of the mixer via connector, P2-24, and a 9 MHz bandpass filter. The difference frequency (2 MHz) is applied to connector, P2-1, via a low pass filter and a 2 MHz buffer amplifier, A1A3Q9.

The MEASURE SENSITIVITY switch, S1, switches 30 dB of gain in or out of the circuit by switching the output of the 11 MHz amplifier, A1A3Q6. The MEASURE SENSITIVITY control, R1, controls the output of the 11 MHz buffer, A1A3Q7, throughout approximately 30 dB of range. The 2 MHz output is applied to the FIM module where it is mixed with 2.1 MHz to produce an IF of 100 kHz, which is applied to a pulse-counting discriminator and the error frequency, if any, will be indicated on the FIM module meter. Also the 100 kHz IF is mixed with 100 kHz in the FIM module to produce the error frequency, if any, which will be audible from the Mainframe speaker, or visible at the FIM module BEAT lamp.

1.3.3 Gen Mod Cal Circuitry (Mainframe MODE switch set to GEN MOD CAL)

The synthesizer input at connector, P1, is 11 MHz and is either frequency modulated or amplitude modulated by the right-hand module. This is amplified by the 39 dB BBA and applied to the mixer, A1A4Z1-L through the 4 dB BBA which is switched off at this time; therefore, the 40 dB pad attenuates the signal. The attenuated output is applied to the A1A3 assembly. At this time, mixer, A1A4Z1, is turned on via A1A4R44 and acts as a closed switch. The MEASURE MODE BANDWIDTH switch is bypassed by diode, CR1, so that the WIDE position is in use.

The 9 MHz is mixed with the modulated signal at mixer, A1A3U1, and the modulated 2 MHz IF signal is applied to the right-hand module where the modulation is detected.

Diode switches A1A6CR2 thru A1A6CR5 are in the (gen) position and prevent the BBA signal from being radiated through the MEASURE INPUT receptacle, J2.

1.3.4 Tone Generator Circuitry (Mainframe MODE switch set to TONE GEN)

In this mode the frequency of the synthesizer input at connector, P1, is "11 MHz +" (11 MHz plus any frequency switch position to the right of the 1 MHz decade switch). This frequency is amplified by the 39 dB BBA and applied to the mixer, A1A4Z1-L. The 4 dB BBA is switched out of the circuit by diode, A1A4CR3, and the attenuated output is applied to the A1A3 assembly, The MEASURE MODE BANDWIDTH switch is bypassed by diode, CR1, so that

the WIDE position is in use. 9 MHz from the Mainframe is mixed with the signal producing a "2 MHz +" IF signal. This "2 MHz +" IF signal is applied to the FIM module where it is mixed with 2.1 MHz producing a "100 kHz +" signal which is mixed with a 100 kHz signal from the Mainframe to produce the frequency set on the Mainframe Frequency switches to the right of the 1 MHz Frequency switch.

This frequency is available at the AUDIO TONE OUTPUT receptacle, J5, on the Mainframe.

Diode switches A1A6CR2 thru A1A6CR5 are in the (gen) position and prevent the BBA signal from being radiated through the MEASURE INPUT receptacle, J2.

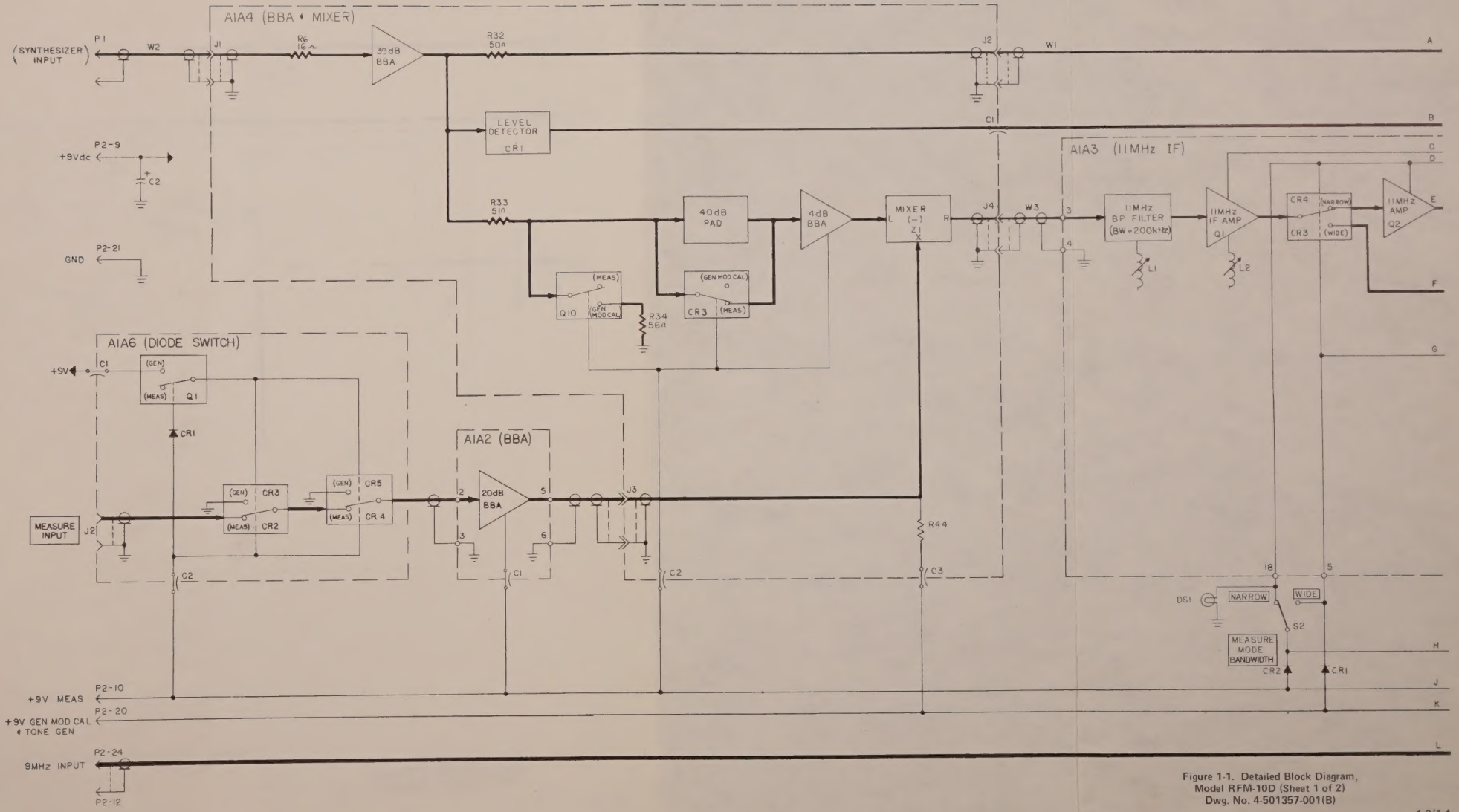

Figure 1-1. Detailed Block Diagram, Model RFM-10D (Sheet 1 of 2) Dwg. No. 4-501357-001(B)

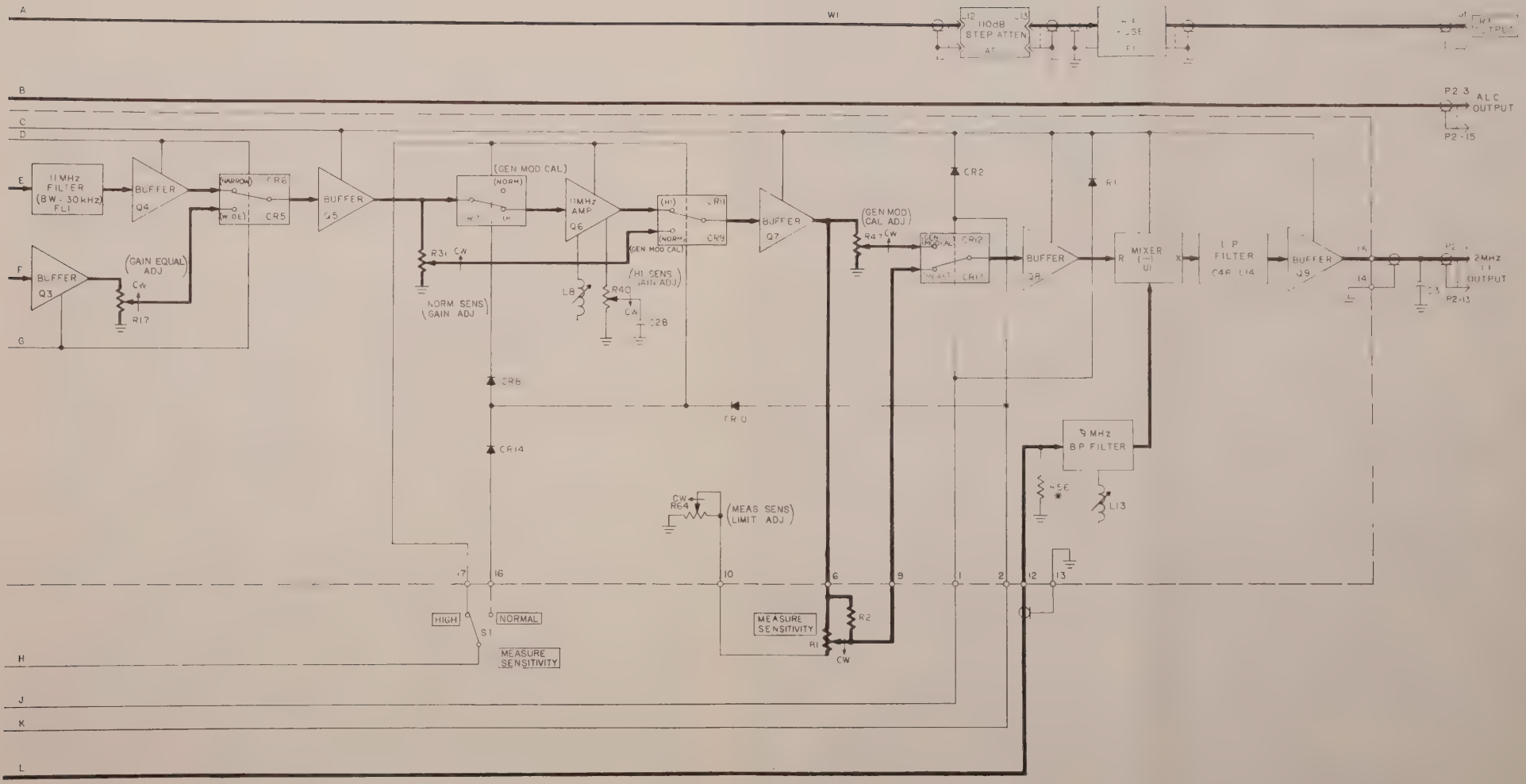

Figure 1-1. Detailed Block Diagram, Model RFM-10D (Sheet 2 of 2) Dwg. No. 4-501357-001(B)

Table 2-1. Test Equipment Requirements, Model RFM-10D

Instrument	Minimum Specifications	Recommended		Use*
		Manufacturer	Model	
Sweep generator	Frequency range: 50 kHz to 512 MHz Output level: −41 dBm to 0 dBm Markers: 50 MHz and multiples to 500 MHz	Wavetek (Refer to Note in Paragraph 2.5.1)	2001	A
RF detector	Frequency range: 50 kHz to 512 MHz	Wavetek	D152	A
Signal generator	Frequency range: 50 kHz to 500 MHz Output level: −101 dBm to 0 dBm Output impedance: 50 ohms	Singer	FM-2748	A,M
Oscilloscope with 10 X probe	Frequency response: dc to 15 MHz Vertical sensitivity: 5 mV/cm Probe capacitance: 10 pF max.	Tektronix	454	A
Frequency monitor	Mainframe	Singer	FM-10C	A,M
Ac voltmeter	Frequency response: 50 Hz to 10 MHz Input level: 2 mV to 400 mV rms Input resistance: 1 megohm minimum Input capacitance: 35 pF maximum	Hewlett-Packard	400E	A,M
RF voltmeter with 50 ohm termination	Frequency range: 50 kHz to 512 MHz Input level: −56 dBm to +6 dBm Accuracy: ±1 dB	Hewlett-Packard (50 ohm tee) (50 ohm load)	3406A 11063A 6064	A,M
DC digital voltmeter	Input level: −17 mV to −23 mV Accuracy: ±1%	Hewlett-Packard	3440A	A
RFM extender cable	24 pin male to 24 pin female	Singer	PC-2652	A
Adapter cable No. 1	Push-on plug to BNC plug assembly 50 ohm coaxial cable 6-1/2 in. long	Singer Assy. Push-on jack BNC plug	1-004818 Gremar 8505A Trompeter PL-24	A
Adapter cable No. 2	Push-on jack to BNC jack 50 ohm coaxial 6 in. long	Push-on jack	Gremar 8212A	A
BNC cable	50 ohm coaxial 6 in. to 12 in. long	BNC plug	UG-88C/U	A
Resistor	200 ohms ±5% 1/4 W	Allen Bradley	CB2015	A

*A = Alignment & Adjustment and Fault Isolation

M = Minimum Performance

2.4.3 **Evaluation of Measure Mode Sensitivity**

a. Set the Mainframe MODE switch to MEAS, MEASURE MODE AUDIO OUTPUT switch to IN-BEAT NOTE, GENERATOR MODULATION switch to OUT-OFF and Frequency switches to 151 MHz.

b. Set the Model RFM-10D MEASURE MODE BANDWIDTH switch to OUT-WIDE. Set the MEASURE SENSITIVITY switch to NORMAL and MEASURE SENSITIVITY control to 0.064 mV rms.

c. Connect the signal generator to the Model RFM-10D MEASURE INPUT receptacle. Set its frequency to 151 MHz and output level to 0.064 mV rms.

d. Connect the ac voltmeter to Pin A of the back panel AUX output receptacle (2 MHz IF output). Vary the signal generator output level to obtain an output level indication of 2.7 mV rms on the ac voltmeter.

NOTE

Alternatively, a convenient indication of the output level may be obtained by observing the turn-on threshold of the OPERATE lamp on a Model FIM-1, FIM-3, or ODM-1, or "Red-line" indication on a Model MDM-1. However, the measurement accuracy may be reduced due to module tolerances and the condition of the module used.

e. The signal generator output level (the sensitivity) should be 0.064 mV rms ±3 dB (0.045 mV to 0.089 mV rms) (NORMAL range).

2.5 ALIGNMENT AND ADJUSTMENT PROCEDURES

All limits and tolerances provided in this procedure are calibration guides, and should not be interpreted as instrument specifications except as listed as a performance requirement in the Specification section of the Operator's

Manual. Where possible, instrument performance should be checked (Refer to Minimum Performance Procedures, Paragraph 2.4) before an adjustment is performed. For best overall instrument performance when performing the complete Alignment and Adjustment Procedure, adjust each trimmer as close as possible to the exact figure even though the Minimum Performance Procedures indicate that the instrument is operating within the allowable tolerance.

Prepare the Model RFM-10D for alignment and adjustment by removing the five screws at the back of the instrument and sliding the cover off. See Figures 2-1 thru 2-3 for test point and trimmer locations.

NOTE

The equipment should be aligned at a temperature of 25°C ±5°C for best overall performance.

2.5.1 Broadband Amplifier Alignment (A1A4) (See Figure 2-1)

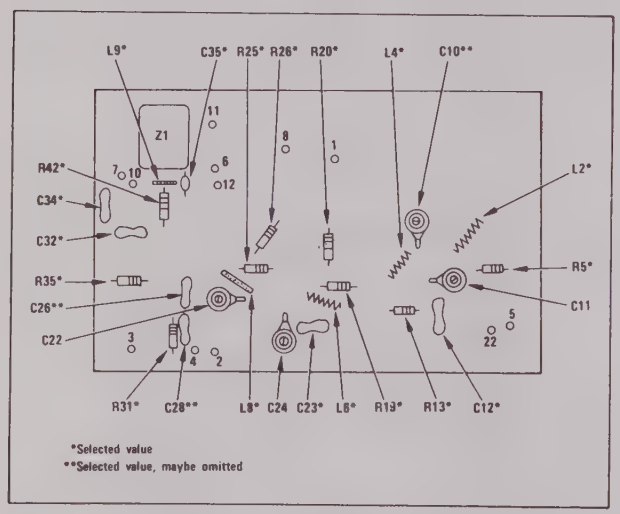

Figure 2-1. Trimmer Locations, Broadband Amplifier and Mixer Assembly, A1A4

NOTE

The following procedure requires a sweep generator covering the frequency range 50 kHz to 512 MHz. Using Wavetek Model 2001 which is rated down to only 200 kHz, the additional range down to 50 kHz may be disregarded up to Step p, since flatness in this range is practically inherent in the design. However, if verification down to 50 kHz is required in Step p, use the signal generator to cover this additional range. In Step p, the generator(s) should be verified for flatness to within ±0.5 dB.

a. Connect the Model RFM-10D to the Mainframe using the RFM module extender cable.

b. Connect the sweep generator RF output receptacle to the back panel RF input connector, P1, on the Model RFM-10D using the push-on to BNC adapter cable No. 1 (Refer to Table 2-1).

c. Unsolder the positive lead of A1A4C35 from the circuit board.

d. Disconnect BNC coaxial cable W1 from A1A4J2 and connect A1A4J2 to the detector RF input receptacle with a 6" to 12" 50 ohm BNC cable.

e. Connect the detector dc output to the sweep generator demodulator input receptacle.

f. Connect the sweep generator oscilloscope vertical receptacle to the oscilloscope vertical input receptacle using a 50 ohm coaxial cable.

g. Connect the sweep generator oscilloscope horizontal receptacle to the oscilloscope horizontal input receptacle using a 50 ohm coaxial cable. Turn on Mainframe power. Set the MODE switch to GEN.

(h.) Measure the dc voltage at P2-9 on the Model RFM-10D rear connector. Verify +9 V ±1%; adjust A1A3R16 in the Mainframe if necessary.

i. Set the sweep generator center frequency control to 250 MHz, sweep width to approximately 520 MHz, 50 MHz marker on, and output level to −33 dBm.

j. Set the oscilloscope timebase to external and adjust the horizontal and vertical amplitude controls and switches for a display that deflects approximately three-quarters of the oscilloscope graticule.

k. Vary the sweep generator marker amplitude controls to display the 50 MHz markers. Vary the center frequency control, if necessary, to display all 50 MHz markers between 50 kHz and 500 MHz.

l. Adjust trimmer capacitors A1A4C10, A1A4C11, A1A4C22 and A1A4C24, and select A1A4C12 and A1A4C23 for the flattest possible response curve on the oscilloscope. Readjust as necessary as there is interaction between the adjustments. (A1A4C10 may be omitted.)

m. Individually short one or more turns of A1A4L2, A1A4L4, A1A4L6 and A1A4L8 together, using two insulated tuning sticks, to obtain the flattest possible response from 50 kHz to 512 MHz. Solder the necessary turns together. Readjust the trimmer capacitors as necessary.

n. Individually select resistors A1A4R5, A1A4R13, A1A4R19 and A1A4R25 as necessary to obtain the flattest overall response. Decrease the resistance values to decrease the gain.

o. If the high frequency gain is too high or the amplifier has a tendency to oscillate, reduce the values of A1A4R20 and A1A4R26 until the required flatness at the high frequency end is obtained or the oscillations cease.

p. After the response curve is flat to within ±1 dB from 50 kHz to 512 MHz, disconnect the detector from A1A4J2 and connect the RF voltmeter with 50 ohm termination to A1A4J2. Set the sweep generator to the CW mode. The output level at A1A4J2 should be 0 dBm ±1 dB. Vary the sweep generator center frequency control from 50 kHz to 512 MHz. The level should not vary more than ±1.5 dB from 0 dBm.

q. Set the sweep generator center frequency to 250 MHz. Vary the sweep generator output level, if necessary, to obtain exactly 0 dBm on the RF voltmeter.

r. Disconnect the RF voltmeter from A1A4J2 and connect the 50 ohm BNC load to A1A4J2. Set the sweep generator to the Δf mode. Set the MODE switch to MEAS.

s. Solder the positive lead of A1A4C35 into its printed circuit pad connected to A1A4L9. Unsolder the negative lead of A1A4C35 from its printed circuit pad. Solder the center conductor of the BNC test cable to the negative lead of A1A4C35 and solder the shield to ground. Connect the detector to this BNC cable.

CAUTION

Do not short the case of A1A4Q9 to ground as it is internally connected to the collector.

t. Select the values of A1A4R42, A1A4C32 and A1A4C34 to obtain the flattest possible response. Capacitor A1A4C32 may be deleted if necessary.

u. Set the sweep generator to the CW mode. Set the center frequency to 250 MHz. The output level at A1A4J4 should be +4 dBm ±2 dB.

v. Unsolder the BNC cable from A1A4C35 and solder the negative lead of A1A4C35 to the printed circuit pad.

2.5.2 Amplifier A1A4 Compression Test

a. Disconnect the BNC to push-on cable adapter from the sweep generator RF output receptacle and connect it to the signal generator RF output receptacle.

b. Disconnect the BNC 50 ohm load from A1A4J2 and connect the RF voltmeter with 50 ohm termination to A1A4J2.

c. Set the signal generator frequency to 50 kHz and set the output level to produce 0 dBm on the RF voltmeter.

d. Increase the signal generator output level 6 dB. The RF voltmeter should indicate +5 dBm minimum.

e. Repeat Steps c and d at 1 MHz, 10 MHz, 50 MHz, and every 50 MHz up to 512 MHz.

2.5.3 ALC Detector Flatness Test and Adjustment

a. Connect the digital voltmeter to P2-3 of the 24 pin back panel connector (ground to the chassis). Open the line from pin 3 in the extender cable to disconnect the Mainframe load from the ALC detector.

b. Set the signal generator frequency to 50 kHz and the output level to produce 0 dBm on the RF voltmeter and observe the digital voltmeter indication.

c. Select the value of A1A4R31 until the indication on the digital voltmeter is approximately −20 mV dc. (Increasing A1A4R31 increases the voltage.)

d. Set the signal generator frequency to 512 MHz and vary the output level to obtain 0 dBm on the RF voltmeter.

e. If the indication of the digital voltmeter is more negative than −23 mV dc, add capacitor A1A4C28 across A1A4R31 (value from 1 pF to 5 pF type DM−15 P/N 1-900003-XXX) until the voltage is approximately equal to that at 50 kHz. If the voltage is less negative than −17 mV dc, add capacitor A1A4C26 across A1A4R30 (value from 0.1 pF to 1.0 pF tubular type P/N 1-900066-XXX) until the voltage is approximately equal to that at 50 kHz.

f. Repeat Step b at 1 MHz, 10 MHz, 50 MHz and every 50 MHz up to 512 MHz. Maintain the amplifier output level at 0 dBm at each frequency. The indication should be −20 mV ±3 mV. If necessary repeat Steps c thru f.

g. Reconnect the pin 3 line of the extender cable.

2.5.4 Broadband Amplifier Alignment (A1A2) (See Figure 2-2)

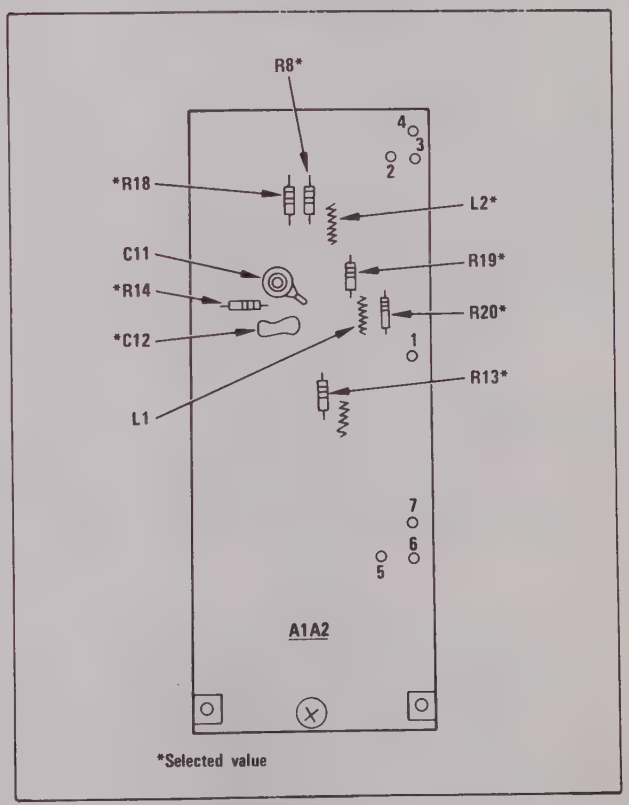

Figure 2-2 Trimmer Locations, Broadband Amplifier Assembly, A1A2

a. Connect the sweep generator RF output receptacle to the MEASURE INPUT receptacle using a 50 ohm BNC cable.

b. Disconnect the BNC cable connector at A1A4J3. Connect the detector RF input receptacle to this cable connector. Connect the detector dc output receptacle to the sweep generator demodulator input receptacle.

c. Connect the sweep generator oscilloscope vertical receptacle to the oscilloscope vertical input receptacle using a 50 ohm coaxial cable.

d. Connect the sweep generator oscilloscope horizontal receptacle to the oscilloscope horizontal input receptacle using a 50 ohm coaxial cable.

e. Set the sweep generator center frequency to 250 MHz, sweep width to approximately 520 MHz, 50 MHz marker switch on, and output level to –41 dBm.

f. Set the oscilloscope timebase to external and vary the horizontal and vertical amplitude controls and switches so that the display deflects approximately three-quarters of the oscilloscope graticule.

g. Vary the sweep generator marker amplitude to display the 50 MHz markers. Vary the center frequency if necessary to display all 50 MHz markers between 50 kHz and 500 MHz.

h. Adjust trimmer capacitor A1A2C11 and select A1A2C12 for the flattest possible response curve on the oscilloscope. Readjust as necessary as there is interaction between the two components.

i. Individually short one of more turns of A1A2L2 together using two insulated tuning sticks to obtain the flattest possible response up to 512 MHz. Solder the necessary turns together. Readjust the trimmer capacitors as necessary.

j. Individually select resistors A1A2R8, A1A2R13, and A1A2R20 (across A1A2L1) as necessary to obtain the flattest overall response. Decrease the resistance to decrease the gain.

k. Individually select resistors A1A2R18 and A1A2R19 as necessary to obtain the flattest overall response. Do not decrease the value of A1A2R18 or A1A2R19 to less than 680 ohms as it will affect the bias of transistors A1A2Q2 and A1A2Q4.

l. When the amplifier response is flat to within ±1.5 dB from 50 kHz to 600 MHz, disconnect the detector RF input receptacle from the A1A2 BNC cable and connect the RF voltmeter to this cable.

m. Set the sweep generator to the CW mode, center frequency to 50 kHz, and the output level to –41 dBm.

n. Vary the sweep generator center frequency from 50 kHz to 512 MHz. The output level should be –21 dBm ±1.5 dB.

o. If the output level is not –21 dBm ±1.5 dB, repeat Steps a thru n to obtain an output level of –21 dBm ±1.5 dB.

p. Set the sweep generator output level to –21 dBm. Vary the center frequency from 50 kHz to 512 MHz. The output level should be –0.75 dBm ±1.25 dB (–2 dBm to +0.5 dBm).

q. If the output level is not within tolerance the amplifier must be realigned so that it is not in compression with an input level of –21 dBm.

2.5.5 11 MHz and 2 MHz IF Amplifier Alignment (A1A3) (See Figure 2-3).

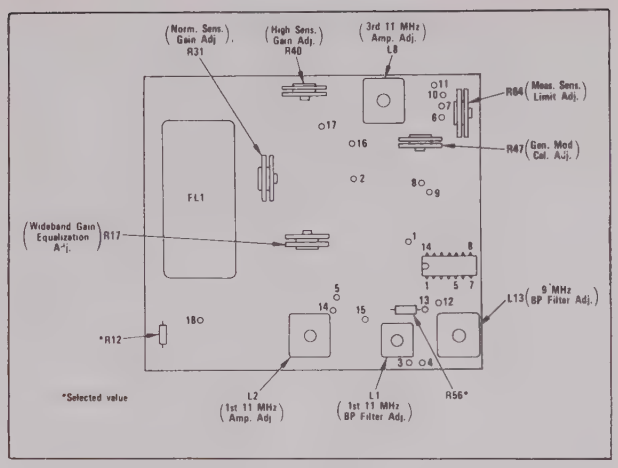
Norm. Sens. Gain Adj R31
High Sens. Gain Adj. R40
3rd 11 MHz Amp. Adj. L8
R64 Meas. Sens. Limit Adj.
R47 Gen. Mod Cal. Adj.
FL1
Wideband Gain Equalization Adj. R17
L13 9 MHz BP Filter Adj.
*R12
*Selected value
L2 1st 11 MHz Amp. Adj
L1 1st 11 MHz BP Filter Adj.
R56*

Figure 2-3. Trimmer Locations, 11 MHz IF Assembly, A1A3

a. Connect the coaxial connector, P1, on the back panel of the Model RFM-10D to its mating connector in the Mainframe using adapter cables No. 1 and No. 2. (Refer to Table 2-1.)

b. Set the Model RFM-10D MEASURE MODE BANDWIDTH switch to the IN-NARROW position and verify that the NARROW lamp is lit. Set the Model RFM-10D MEASURE SENSITIVITY switch to the NORMAL position and the MEASURE SENSITIVITY control to the fully cw position (0.064 mV).

c. Set the Mainframe Frequency switches to 151 MHz (or some other frequency above 11 MHz which is not affected by internal spurious signals).

d. Using the ac voltmeter, measure the level of the 9 MHz synthesizer signal at P2-24 on the Model RFM-10D back panel 24 pin connector. This level should be +3 dBm ±2 dB. If necessary select A2C16 in the Mainframe to obtain this level.

e. Remove cable, W1, from the step attenuator and connect W1 to the 50 ohm RF voltmeter probe. Adjust A1A2R31 (ALC) in the Mainframe to obtain a level of 0 dBm. This sets the 162 MHz input from the synthesizer at –33 dBm.

f. Connect the ac voltmeter to the back panel 24 pin connector; center conductor to P2-1, and shield to P2-13.

g. Connect the signal generator to the Model RFM-10D MEAS INPUT receptacle, and set to the frequency of the Mainframe (151 MHz).

h. Set the Model RFM-10D MEASURE SENSITIVITY control to fully ccw (2 mV) and set the MEASURE SENSITIVITY switch to NORMAL.

i. Connect the oscilloscope 10X probe to the junction of A1A3R2 and A1A3R3. Adjust A1A3L1 for maximum amplitude at 11 MHz. The level should be approximately 30 mV p-p. (Note this level for Step m.)

j. Connect the oscilloscope 10X probe to the junction of A1A3C5 and A1A3C6. Adjust A1A3L2 for maximum amplitude at 11 MHz. The level should be approximately 120 mV p-p.

k. Set the Model RFM-10D MEASURE MODE BANDWIDTH switch to IN-NARROW. The NARROW lamp should be lit.

l. Connect the oscilloscope 10X probe to the junction of A1A3CR5 and A1A3CR6. The level should be approximately 95 mV p-p.

m. Set the Model RFM-10D MEASURE MODE BANDWIDTH switch to OUT-WIDE. The NARROW lamp should be extinguished. Adjust A1A3R17 (Wideband Equalization Adj.) to obtain the same level as in Step i. If A1A3R17 has insufficient range, increase the value of A1A3R12.

n. Connect the oscilloscope 10X probe to the junction of A1A3CR9 and A1A3CR11. Set the Model RFM-10D MEASURE SENSITIVITY switch to HIGH and set A1A3R31, A1A3R40 and A1A3R47 to the mid-range positions. Adjust A1A3L8 for maximum amplitude at 11 MHz.

o. Connect the oscilloscope 10X probe to A1A3U1-5. Adjust A1A3L13 for maximum amplitude at 9 MHz. The level should be approximately 600 mV p-p.

2.5.6 RF Output Leveling

a. Set the Mainframe MODE switch to the GEN position, Frequency switches to 250 MHz, RF OUTPUT switches to 10 dBm.

b. Connect the RF voltmeter with 50 ohm termination to the Model RFM-10D RF OUTPUT receptacle.

c. Adjust the Mainframe A1A2R31 to obtain −10 dBm on the RF voltmeter. Rotate the Mainframe Frequency switches to each position (100 MHz control 0 to 5 only). The RF output level shall be −10 dBm ±1 dB from 50 kHz to 512 MHz.

d. Reconnect the cables disconnected in Step a.

2.5.7 Gen Mod Cal Adjustment

a. Set the Mainframe MODE switch to GEN MOD CAL.

b. Connect the ac voltmeter to the 2 MHz IF output, P2-1 of the 24 pin receptacle on the back panel of the Model RFM-10D (Ground to P2-13).

c. Verify that A1A3R47 (Gen Mod Cal Adj.) is set to its mid-range position.

d. Select the value of A1A4R35 for 4.5 mV rms indication on the ac voltmeter. If exactly 4.5 mV rms cannot be obtained with standard 5% resistor values, select a value that will produce a level as near to 4.5 mV rms as possible and adjust A1A3R47 to obtain exactly 4.5 mV rms.

2.5.8 Measure Input Sensitivity and Calibration

a. Connect the signal generator to the MEASURE INPUT receptacle of the Model RFM-10D. Set the frequency to 151 MHz and the output level to −71 dBm.

b. Connect the RF voltmeter to the junction of A1A6C9 and A1A6C10 (output of the A1A6 assembly).

c. Select the value of A1A6R3 for an indication of −54 dBm on the RF voltmeter (may require only a jumper wire). Remove the RF voltmeter.

d. Set the Model RFM-10D MEASURE SENSITIVITY control to fully cw (0.064 mV) and set the MEASURE SENSITIVITY switch to NORMAL.

e. Adjust A1A3R31 (Normal Sens. Gain Adj.) for exactly 2.7 mV rms on the ac voltmeter (connected as in Paragraph 2.5.7-b).

f. Set the Model RFM-10D MEASURE SENSITIVITY control to fully ccw (2 mV). Set the 151 MHz signal generator output level to −41 dBm.

g. Adjust A1A3R64 (Meas. Sens. Limit Adj.) for exactly 2.7 mV rms on the ac voltmeter.

h. Repeat Steps d thru g to obtain exactly 30 dB of range for the MEASURE SENSITIVITY control.

i. Set the 151 MHz signal generator output level to −71 dBm.

j. Set the Model RFM-10D MEASURE SENSITIVITY switch to HIGH and leave the control set to fully ccw (64 uV).

k. Adjust A1A3R40 (High Sens. Gain Adj.) for exactly 2.7 mV rms on the ac voltmeter.

l. Set the 151 MHz signal generator output level to −101 dBm. Set the Model RFM-10D MEASURE SENSITIVITY vernier to fully cw (2 uV). The ac voltmeter should indicate exactly 2.5 mV rms. If not, repeat Steps d thru l.

m. Set the Model RFM-10D MEASURE SENSITIVITY control to 4 uV. Vary the 151 MHz signal generator output level for a 2.7 mV rms indication on the ac voltmeter. The signal source output level should be −95 dBm ±3 dB.

n. Repeat Step m. except substitute 8 uV for 4 uV and −89 dBm ±3 dB for −95 dBm ±3 dB.

o. Repeat Step m. except substitute 16 uV for 4 uV and −83 dBm ±3 dB for −95 dBm ±3 dB.

p. Repeat Step m. except substitute 32 uV for 4 uV and −77 dBm ±3 dB for −95 dBm ±3 dB.

q. Set the Model RFM-10D MEASURE SENSITIVITY switch to NORMAL.

r. Repeat Step m. except substitute 0.125 mV for 4 uV and −65 dBm ±3 dB for −95 dBm ±3 dB.

s. Repeat Step m. except substitute 0.25 mV for 4 uV and −59 dBm ±3 dB for −95 dBm ±3 dB.

t. Repeat Step m. except substitute 0.5 mV for 4 uV and −53 dBm ±3 dB for −95 dBm ±3 dB.

u. Repeat Step m. except substitute 1.0 mV for 4 uV and −47 dBm ±3 dB for −95 dBm ±3 dB.

v. Set the Model RFM-10D MEASURE SENSITIVITY control to fully ccw (2 mV). Set the 151 MHz signal source frequency to 50 kHz.

w. Vary the signal source output level for a 2.7 mV rms indication on the ac voltmeter. The signal source output level should be −41 dBm ±3 dB.

x. Repeat Step w. at 1 MHz, 50 MHz, every 50 MHz up to 500 MHz and at 512 MHz. Disconnect the 151 MHz signal source from the Model RFM-10D.

2.6 FAULT ISOLATION PROCEDURES

Fault Isolation Procedures are presented to provide a guide in servicing the Model RFM-10D. The procedures follow the sequence of the Minimum Performance Procedures of Paragraph 2.4, with each subsection keyed to the step in Paragraph 2.4 that first indicates a fault. When a fault is noted during the Model RFM-10D operation, proceed as follows:

a. Perform Minimum Performance Procedures in Paragraph 2.4.

b. Start Fault Isolation Procedures at the point where minimum performance cannot be satisfied.

c. When the fault is isolated to a function, such as the 11 MHz amplifier, refer to the alignment procedures for that function in Paragraph 2.5 and check alignment of that function before proceeding with fault isolation.

d. After a fault is repaired, complete the Minimum Performance Procedures to determine if further alignment is necessary.

2.6.1 Output Level Not Within Tolerance (2.4.2-d and 2.4.2-e)

a. Check alignment of broadband amplifier as in Paragraph 2.5.1.

b. Check step attenuator AT1.

c. Check RF Output Leveling as in Paragraph 2.5.6.

d. Check Mainframe as in Mainframe Maintenance Manual.

2.6.2 Measure Mode Sensitivity Not Within Tolerance (2.4.3-e)

a. Check measure input sensitivity alignment as in Paragraph 2.5.8.

b. Check 11 MHz IF alignment as in Paragraph 2.5.5.

c. Check 9 MHz filter alignment as in Paragraph 2.5.5.

d. Check 2 MHz IF alignment as in Paragraph 2.5.5.

e. Check Diode Switch Assembly, A1A6, as in Paragraph 2.5.8-a thru c.

Section III
REPLACEABLE PARTS

3.1 INTRODUCTION

This section contains information for ordering replacement parts. Tables 3-1 thru 3-5 list the parts according to their functional groupings. Parts are listed in alpha-numerical order of their reference designators and indicate the description, the Singer part number, typical manufacturer of the part in a five-digit code, and the manufacturer's part number. Table 3-6 lists the typical manufacturers in numercial code number order.

Table 3-1. Parts List for Main Assemblies and Chassis

Ref. Desig.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
A1A1	Not used			
A1A2	Assembly, Broadband Amplifier	1-004840-001	88869	
A1A3	Assembly, 11 MHz and 2 MHz IF Amplifier	4-004836-001	88869	
A1A4	Assembly, Broadband Amplifier, Mixer Detector	1-004820-001	88869	
A1A5	Not used			
A1A6	Assembly, Diode Switch	3-005085-001	88869	
AT1	Attenuator, step, assembly, dual concentric, 0 dB to 110 dB in 1.0 dB and 10 dB steps	4-403416-001	88869	
C1	Not used			
C2	Capacitor, fixed, electrolytic, 50 uF, - 10% +75%, 25 V dc	1-900039-005	72699	984-1654
C3	Capacitor, fixed, mica, 150 pF, ±5%, 500 V dc	1-900003-034	72136	DM15
CR1	Diode, silicon, Vr=75 V, If=10 mA	1-913007-001	03508	1N4148
CR2	Diode, silicon, Vr=75 V, If=10 mA	1-913007-001	03508	1N4148
DS1	Indicator lamp assembly, red lens, 10 V, 20 mA	1-925007-003	32539	L10/20
F1	Fuse, RF assembly, +10 dBm	3-403417-001	88869	
J1	Part of F1			
J2	Part of A1A2W2			
P1	Part of W2			
P2	Connector, plug, rectangular, 24 pin	1-910071-002	13511	26-159-24
R1	Resistor, variable, composition, 1.0 kilohm, ±30%, 1/2 W (Part of S1)			
R2	Resistor, fixed, composition, 1.0 kilohm, ±10%, 1/4 W (Part of S1)			
S1/R1/R2	Switch/variable resistor assembly, (S1) Switch, rotary, 1 pole, 2 position	1-004938-001	88869	
S2	Switch, push-push, 2 pole, 2 position	1-951024-002	82389	65017-206
W1	Cable assembly, 7 in., BNC to rt. angle BNC	1-004890-001	88869	
W2	Cable assembly, 6-1/2 in., BNC to push-on	1-004818-001	88869	
W3	Cable assembly, 9-1/2 in., phono plug one end	1-004819-001	88869	
	Knob, black (MEASURE SENSITIVITY)	1-935003-101	21604	RSS50L-1
	Knob, black, concentric (HIGH-NORMAL)	1-935007-002	21604	SSN70CL-2
	Pawl, adjustable (2 req.)	1-964183-001	08730	SS6121

Table 3-2. Parts List for Broadband Amplifier Assembly, A1A2

Ref. Desig.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
C1 (Chassis)	Capacitor, fixed, feed-thru, 0.001 uF, -0% +100%, 500 V dc	1-900038-001	01121	FB2B102W
C1	Capacitor, fixed, electrolytic, 1.0 uF, ±20%, 50 V dc	1-900115-003	12954	DIROGSA50M
C2	Capacitor, fixed, electrolytic, 1.0 uF, ±20%, 50 V dc	1-900115-003	12954	DIROGSA50M
C3	Capacitor, fixed, electrolytic, 0.1 uF, ±20%, 50 V dc	1-900115-002	12954	DR10GSA50M
C4	Capacitor, fixed, electrolytic, 0.1 uF, ±20%, 50 V dc	1-900115-002	12954	DR10GSA50M
C5	Capacitor, fixed, electrolytic, 0.1 uF, ±20%, 50 V dc	1-900115-002	12954	DR10GSA50M
C6	Capacitor, fixed, electrolytic, 1.0 uF, ±20%, 50 V dc	1-900115-003	12954	DIROGSA50M
C7	Capacitor, fixed, electrolytic, 1.0 uF, ±20%, 50 V dc	1-900115-003	12954	DIROGSA50M
C8	Capacitor, fixed, electrolytic, 0.1 uF, ±20%, 50 V dc	1-900115-002	12954	DR10GSA50M
C9	Capacitor, fixed, electrolytic, 0.1 uF, ±20%, 50 V dc	1-900115-002	12954	DR10GSA50M
C10	Not used			
C11	Capacitor, variable, ceramic, 1.7 pF to 10 pF, 500 V dc	1-900113-002	91293	9301
C12	Capacitor, fixed, mica, selected, 5 pF nominal, ±10%, 500 V dc	1-900003-004	72136	DM15
C13	Capacitor, fixed, electrolytic, 1.0 uF, ±20%, 50 V dc	1-900115-003	12954	DIROGSA50M
L1	Inductor, fixed, 1.0 mH, ±10%, 139 mA	1-906016-049	24759	DR1000
L2	Inductor, fixed, selected, 8 turns nominal	1-403283-007	88869	
L3	Inductor, fixed, 1.0 mH, ±10%, 139 mA	1-906016-049	24759	DR1000
L4	Inductor, fixed, selected, 8 turns nominal	1-403690-001	88869	
Q1	Transistor, silicon, PNP	1-958000-002	04713	2N3906-5
Q2	Transistor, silicon, NPN	1-958064-001	73445	A486
Q3	Transistor, silicon, PNP	1-958000-002	04713	2N3906-5
Q4	Transistor, silicon, NPN	1-958064-001	73445	A486
R1	Resistor, fixed, composition, 16 ohm, ±5%, 1/4 W	1-945000-119	01121	CB1605
R2	Not used			
R3	Not used			
R4	Resistor, fixed, composition, 1.5 kilohm, ±5%, 1/4 W	1-945000-166	01121	CB1525
R5	Resistor, fixed, composition, 3.6 kilohm, ±5%, 1/4 W	1-945000-175	01121	CB3625

Table 3-2. Parts List for Broadband Amplifier Assembly, A1A2 (Cont.)

Ref. Desig.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
R6	Resistor, fixed, composition, 150 ohm, ±5%, 1/4 W	1-945000-142	01121	CB1515
R7	Resistor, fixed, composition, 3.9 kilohm, ±5%, 1/4 W	1-945000-176	01121	CB3925
R8	Resistor, fixed, composition, selected, 330 ohm nominal, ±5%, 1/4 W	1-945000-150	01121	CB3315
R9	Resistor, fixed, composition, 1.5 kilohm, ±5%, 1/4 W	1-945000-166	01121	CB1525
R10	Resistor, fixed, composition, 7.5 kilohm, ±5%, 1/4 W	1-945000-183	01121	CB7525
R11	Resistor, fixed, composition, 75 ohm, ±5%, 1/4 W	1-945000-135	01121	CB7505
R12	Resistor, fixed, composition, 3.9 kilohm, ±5%, 1/4 W	1-945000-176	01121	CB3925
R13	Resistor, fixed, composition, selected, 180 ohm nominal, ±5%, 1/4 W	1-945000-144	01121	CB1815
R14	Resistor, fixed, composition, selected, 47 ohm nominal, ±5%, 1/4 W	1-945000-130	01121	CB4705
R15	Not used			
R16	Not used			
R17	Not used			
R18	Resistor, fixed, composition, selected, 1.0 kilohm nominal, ±5%, 1/4 W	1-945000-162	01121	CB1025
R19	Resistor, fixed, composition, selected, 1.0 kilohm nominal, ±5%, 1/4 W	1-945000-162	01121	CB1025
R20	Resistor, fixed, composition, selected, 180 ohm nominal, ±5%, 1/4 W	1-945000-142	01121	CB1815
W1	Cable assembly, 10 in., BNC at one end	1-004888-001	88869	
W2	Cable assembly, 12 in., BNC at one end	1-004889-001	88869	

Table 3-3. Parts List for 11.0 MHz and 2.0 MHz IF Amplifier Assembly, A1A3

Ref. Desig.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
C1	Capacitor, fixed, plastic, 0.01 uF, ±20%, 250 V dc	1-900001-001	73445	C280AE
C2	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
C3	Capacitor, fixed, mica, 680 pF, ±5%, 300 V dc	1-900003-052	72136	DM15
C4	Capacitor, fixed, plastic, 0.1 uF, ±20%, 250 V dc	1-900001-013	73445	C280AE
C5	Capacitor, fixed, mica, 680 pF, ±5%, 300 V dc	1-900003-052	72136	DM15
C6	Capacitor, fixed, mica, 270 pF, ±5%, 500 V dc	1-900072-027	72136	SCDM10
C7	Not used			
C8	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
C9	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
C10	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
C11	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
C12	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
C13	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
C14	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
C15	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
C16	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
C17	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
C18	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
C19	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
C20	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
C21	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
C22	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
C23	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
C24	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10

Table 3-3. Parts List for 11.0 MHz and 2.0 MHz IF Amplifier Assembly, A1A3 (Cont.)

Ref. Desig.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
C25	Capacitor, fixed, plastic, 0.01 uF, ±20%, 250 V dc	1-900001-001	73445	C280AE
C26	Capacitor, fixed, mica, 680 pF, ±5%, 300 V dc	1-900003-052	72136	DM15
C27	Capacitor, fixed, mica, 270 pF, ±5%, 500 V dc	1-900072-027	72136	SCDM10
C28	Capacitor, fixed, plastic, 0.01 uF, ±20%, 250 V dc	1-900001-001	73445	C280AE
C29	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
C30	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
C31	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
C32	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
C33	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
C34	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
C35	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
C36	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
C37	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
C38	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
C39	Capacitor, fixed, mica, 330 pF, ±5%, 500 V dc	1-900072-029	72136	SCDM10
C40	Capacitor, fixed, mica, 100 pF, ±5%, 500 V dc	1-900072-020	72136	SCDM10
C41	Capacitor, fixed, mica, 1200 pF, ±5%, 100 V dc	1-900003-057	72136	DM15
C42	Capacitor, fixed, plastic, 0.1 uF, ±20%, 250 V dc	1-900001-013	73445	C280AE
C43	Capacitor, fixed, plastic, 0.1 uF, ±20%, 250 V dc	1-900001-013	73445	C280AE
C44	Capacitor, fixed, plastic, 0.1 uF, ±20%, 250 V dc	1-900001-013	73445	C280AE
C45	Capacitor, fixed, plastic, 0.1 uF, ±20%, 250 V dc	1-900001-013	73445	C280AE
C46	Capacitor, fixed, mica, 120 pF, ±5%, 500 V dc	1-900072-021	72136	SCDM10
C47	Capacitor, fixed, mica, 120 pF, ±5%, 500 V dc	1-900072-021	72136	SCDM10
C48	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10

Table 3-3. Parts List for 11.0 MHz and 2.0 MHz IF Amplifier Assembly, A1A3 (Cont.)

Ref. Desig.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
C49	Capacitor, fixed, mica, 1000 pF, ±5%, 100 V dc	1-900003-056	72136	DM15
C50	Capacitor, fixed, plastic, 0.1 uF, ±20%, 250 V dc	1-900001-013	73445	C280AE
C51	Capacitor, fixed, ceramic, 0.01 uF, ±20%, 100 V dc	1-900077-002	56289	TG-S10
CR1	Diode, germanium, Vr=30 V, If=100 mA	1-913005-001	03877	1N273
CR2	Diode, germanium, Vr=30 V, If=100 mA	1-913005-001	03877	1N273
CR3	Diode, silicon, Vr=20 V, If=100 mA	1-913074-001	80795	ITT244
CR4	Diode, silicon, Vr=20 V, If=100 mA	1-913074-001	80795	ITT244
CR5	Diode, silicon, Vr=20 V, If=100 mA	1-913074-001	80795	ITT244
CR6	Diode, silicon, Vr=20 V, If=100 mA	1-913074-001	80795	ITT244
CR7	Diode, silicon, Vr=20 V, If=100 mA	1-913074-001	80795	ITT244
CR8	Diode, silicon, Vr=20 V, If=100 mA	1-913074-001	80795	ITT244
CR9	Diode, silicon, Vr=20 V, If=100 mA	1-913074-001	80795	ITT244
CR10	Diode, germanium, Vr=30 V, If=100 mA	1-913005-001	03877	1N273
CR11	Diode, silicon, Vr=20 V, If=100 mA	1-913074-001	80795	ITT244
CR12	Diode, silicon, Vr=20 V, If=100 mA	1-913074-001	80795	ITT244
CR13	Diode, silicon, Vr=20 V, If=100 mA	1-913074-001	80795	ITT244
CR14	Diode, germanium, Vr=30 V, If=100 mA	1-913005-001	03877	1N273
FL1	Filter, crystal, bandpass, Center freq.: 11 MHz ±1 kHz, BW_6=90 kHz	1-403279-001	88869	
L1	Inductor, variable, 0.3 uH to 0.5 uH	1-403586-001	88869	
L2	Inductor, variable, 1.3 uH to 1.8 uH	1-906006-006	88869	
L3	Inductor, fixed, 330 uH, ±10%, 75 mA	1-906038-001	29525	C1017-47
L4	Inductor, fixed, 330 uH, ±10%, 75 mA	1-906038-001	29525	C1017-47
L5	Inductor, fixed, 330 uH, ±10%, 75 mA	1-906038-001	29525	C1017-47
L6	Inductor, fixed, 330 uH, ±10%, 75 mA	1-906038-001	29525	C1017-47

SEE ISSUE SHEET

REPLACED BY 1-906043-043

CAUTION
CHANGES HAVE BEEN MADE
ON THIS PAGE.
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Table 3-3. Parts List for 11.0 MHz and 2.0 MHz IF Amplifier Assembly, A1A3 (Cont.)

Ref. Desig.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
L7	Inductor, fixed, 330 uH, ±10%, 75 mA	1-906038-001	29525	C1017-47
L8	Inductor, variable, 1.3 uH to 1.8 uH	1-906006-006	88869	
L9	Inductor, fixed, 330 uH, ±10%, 75 mA	1-906038-001	29525	C1017-47
L10	Inductor, fixed, 330 uH, ±10%, 75 mA	1-906038-001	29525	C1017-47
L11	Inductor, fixed, 330 uH, ±10%, 75 mA	1-906038-001	29525	C1017-47
L12	Inductor, fixed, 330 uH, ±10%, 75 mA	1-906038-001	29525	C1017-47
L13	Inductor, variable, 1.3 uH to 1.8 uH	1-906006-006	88869	
L14	Inductor, fixed, 85 uH, ±5%, 140 mA	1-906022-009	29525	13-85-5
Q1	Transistor, silicon, NPN	1-958018-001	49675	2N5179
Q2	Transistor, silicon, NPN	1-958018-001	49675	2N5179
Q3	Transistor, silicon, NPN	1-958018-001	49675	2N5179
Q4	Transistor, silicon, NPN	1-958018-001	49675	2N5179
Q5	Transistor, silicon, NPN	1-958018-001	49675	2N5179
Q6	Transistor, silicon, NPN	1-958018-001	49675	2N5179
Q7	Transistor, silicon, NPN	1-958018-001	49675	2N5179
Q8	Transistor, silicon, NPN	1-958018-001	49675	2N5179
Q9	Transistor, silicon, NPN	1-958000-001	04713	2N3904-5
R1	Resistor, fixed, composition, 100 ohm, ±10%, 1/4 W	1-945000-025	01121	CB1011
R2	Resistor, fixed, composition, 2.2 kilohm, ±10%, 1/4 W	1-945000-041	01121	CB2221
R3	Resistor, fixed, composition, 33 ohm, ±10%, 1/4 W	1-945000-019	01121	CB3301
R4	Resistor, fixed, composition, 470 ohm, ±10%, 1/4 W	1-945000-033	01121	CB4711
R5	Resistor, fixed, composition, 270 ohm, ±10%, 1/4 W	1-945000-030	01121	CB2711
R6	Resistor, fixed, composition, 1.0 kilohm, ±10%, 1/4 W	1-945000-037	01121	CB1021
R7	Resistor, fixed, composition, 5.6 kilohm, ±10%, 1/4 W	1-945000-046	01121	CB5621
R8	Resistor, fixed, composition, 33 ohm, ±10%, 1/4 W	1-945000-019	01121	CB3301
R9	Resistor, fixed, composition, 2.7 kilohm, ±10%, 1/4 W	1-945000-042	01121	CB2721
R10	Resistor, fixed, composition, 100 ohm, ±10%, 1/4 W	1-945000-025	01121	CB1011
R11	Resistor, fixed, composition, 430 ohm, ±5%, 1/4 W	1-945000-153	01121	CB4315

Table 3-3. Parts List for 11.0 MHz and 2.0 MHz IF Amplifier Assembly, A1A3 (Cont.)

Ref. Desig.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
R12	Resistor, fixed, composition, selected, 180 ohm nominal, ±10%, 1/4 W	1-945000-028	01121	CB1811
R13	Resistor, fixed, composition, 100 ohm, ±10%, 1/4 W	1-945000-025	01121	CB1011
R14	Resistor, fixed, composition, 4.7 kilohm, ±10%, 1/4 W	1-945000-045	01121	CB4721
R15	Resistor, fixed, composition, 33 ohm, ±10%, 1/4 W	1-945000-019	01121	CB3301
R16	Resistor, fixed, composition, 2.7 kilohm, ±10%, 1/4 W	1-945000-042	01121	CB2721
R17	Resistor, variable, composition, 500 ohm, ±30%, 1/5 W	1-945007-003	71450	X201
R18	Resistor, fixed, composition, 100 ohm, ±10%, 1/4 W	1-945000-025	01121	CB1011
R19	Resistor, fixed, composition, 47 kilohm, ±10%, 1/4 W	1-945000-057	01121	CB4731
R20	Resistor, fixed, composition, 47 kilohm, ±10%, 1/4 W	1-945000-057	01121	CB4731
R21	Resistor, fixed, composition, 5.6 kilohm, ±10%, 1/4 W	1-945000-046	01121	CB5621
R22	Resistor, fixed, composition, 33 ohm, ±10%, 1/4 W	1-945000-019	01121	CB3301
R23	Resistor, fixed, composition, 470 ohm, ±10%, 1/4 W	1-945000-033	01121	CB4711
R24	Resistor, fixed, composition, 2.2 kilohm, ±10%, 1/4 W	1-945000-041	01121	CB2221
R25	Resistor, fixed, composition, 560 ohm, ±10%, 1/4 W	1-945000-034	01121	CB5611
R26	Resistor, fixed, composition, 560 ohm, ±10%, 1/4 W	1-945000-034	01121	CB5611
R27	Resistor, fixed, composition, 470 ohm, ±10%, 1/4 W	1-945000-033	01121	CB4711
R28	Resistor, fixed, composition, 33 ohm, ±10%, 1/4 W	1-945000-019	01121	CB3301
R29	Resistor, fixed, composition, 470 ohm, ±10%, 1/4 W	1-945000-033	01121	CB4711
R30	Resistor, fixed, composition, 100 ohm, ±10%, 1/4 W	1-945000-025	01121	CB1011
R31	Resistor, variable, composition, 500 ohm, ±30%, 1/5 W	1-945007-003	71450	X201
R32	Resistor, fixed, composition, 680 ohm, ±10%, 1/4 W	1-945000-035	01121	CB6811
R33	Resistor, fixed, composition, 390 ohm, ±10%, 1/4 W	1-945000-032	01121	CB3911
R34	Resistor, fixed, composition, 47 kilohm, ±10%, 1/4 W	1-945000-057	01121	CB4731
R35	Resistor, fixed, composition, 12 kilohm, ±10%, 1/4 W	1-945000-050	01121	CB1231

Table 3-3. Parts List for 11.0 MHz and 2.0 MHz IF Amplifier Assembly, A1A3 (Cont.)

Ref. Desig.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
R36	Resistor, fixed, composition, 33 ohm, ±10%, 1/4 W	1-945000-019	01121	CB3301
R37	Resistor, fixed, composition, 4.7 kilohm, ±10%, 1/4 W	1-945000-045	01121	CB4721
R38	Resistor, fixed, composition, 680 ohm, ±10%, 1/4 W	1-945000-035	01121	CB6811
R39	Resistor, fixed, composition, 100 ohm, ±10%, 1/4 W	1-945000-025	01121	CB1011
R40	Resistor, variable, composition, 500 ohm, ±30%, 1/5 W	1-945007-003	71450	X201
R41	Resistor, fixed, composition, 47 kilohm, ±10%, 1/4 W	1-945000-057	01121	CB4731
R42	Resistor, fixed, composition, 680 ohm, ±10%, 1/4 W	1-945000-035	01121	CB6811
R43	Resistor, fixed, composition, 680 ohm, ±10%, 1/4 W	1-945000-035	01121	CB6811
R44	Resistor, fixed, composition, 33 ohm, ±10%, 1/4 W	1-945000-019	01121	CB3301
R45	Resistor, fixed, composition, 390 ohm, ±10%, 1/4 W	1-945000-032	01121	CB3911
R46	Resistor, fixed, composition, 100 ohm, ±10%, 1/4 W	1-945000-025	01121	CB1011
R47	Resistor, variable, composition, 250 ohm, ±30%, 1/5 W	1-945007-002	71450	X201
R48	Resistor, fixed, composition, 47 kilohm, ±10%, 1/4 W	1-945000-057	01121	CB4731
R49	Resistor, fixed, composition, 1.0 kilohm, ±10%, 1/4 W	1-945000-037	01121	CB1021
R50	Resistor, fixed, composition, 47 kilohm, ±10%, 1/4 W	1-945000-057	01121	CB4731
R51	Resistor, fixed, composition, 33 ohm, ±10%, 1/4 W	1-945000-019	01121	CB3301
R52	Resistor, fixed, composition, 22 kilohm, ±10%, 1/4 W	1-945000-053	01121	CB2231
R53	Resistor, fixed, composition, 10 kilohm, ±10%, 1/4 W	1-945000-049	01121	CB1031
R54	Resistor, fixed, composition, 100 ohm, ±10%, 1/4 W	1-945000-025	01121	CB1011
R55	Resistor, fixed, composition, 470 ohm, ±10%, 1/4 W	1-945000-033	01121	CB4711
R56	Resistor, fixed, composition, selected, 470 ohm nominal, ±10%, 1/4 W	1-945000-033	01121	CB4711
R57	Resistor, fixed, composition, 10 kilohm, ±10%, 1/4 W	1-945000-049	01121	CB1031
R58	Resistor, fixed, composition, 6.8 kilohm, ±10%, 1/4 W	1-945000-047	01121	CB6821
R59	Resistor, fixed, composition, 33 ohm, ±10%, 1/4 W	1-945000-019	01121	CB3301

Table 3-3. Parts List for 11.0 MHz and 2.0 MHz IF Amplifier Assembly, A1A3 (Cont.)

Ref. Desig.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
R60	Resistor, fixed, composition, 10 kilohm, ±10%, 1/4 W	1-945000-049	01121	CB1031
R61	Resistor, fixed, composition, 2.7 kilohm, ±10%, 1/4 W	1-945000-042	01121	CB2721
R62	Resistor, fixed, composition, 100 ohm, ±10%, 1/4 W	1-945000-025	01121	CB1011
R63	Resistor, fixed, composition, 150 ohm, ±10%, 1/4 W	1-945000-027	01121	CB1511
U1	Integrated circuit, balanced mixer	1-926007-026	01295	SN76514N

Table 3-4. Parts List for Broadband Amplifier and Doubly Balanced Mixer Assembly, A1A4

Ref. Desig.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
C1 (Chassis)	Capacitor, fixed, feed-thru, 0.001 uF, -0% +100%, 500 V dc	1-900038-001	01121	FB2B102W
C2 (Chassis)	Capacitor, fixed, feed-thru, 0.001 uF, -0% +100%, 500 V dc	1-900038-001	01121	FB2B102W
C3 (Chassis)	Capacitor, fixed, feed-thru, 0.001 uF, -0% +100%, 500 V dc	1-900038-001	01121	FB2B102W
C4 (Chassis)	Capacitor, fixed, feed-thru, 0.001 uF, -0% +100%, 500 V dc	1-900038-001	01121	FB2B102W
FL1 (Chassis)	Filter, feed-thru, 3000 pF min., 500 V dc	1-919011-004	72982	1202-052
C1	Capacitor, fixed, electrolytic, 1.0 uF, ±20%, 50 V dc	1-900115-003	12954	DIROGSA50M
C2	Capacitor, fixed, electrolytic, 1.0 uF, ±20%, 50 V dc	1-900115-003	12954	DIROGSA50M
C3	Capacitor, fixed, electrolytic, 0.1 uF, ±20%, 50 V dc	1-900115-002	12954	DRIOGSA50M
C4	Capacitor, fixed, electrolytic, 1.0 uF, ±20%, 50 V dc	1-900115-003	12954	DIROGSA50M
C5	Capacitor, fixed, electrolytic, 0.1 uF, ±20%, 50 V dc	1-900115-002	12954	DRIOGSA50M
C6	Capacitor, fixed, electrolytic, 1.0 uF, ±20%, 50 V dc	1-900115-003	12954	DIROGSA50M
C7	Capacitor, fixed, electrolytic, 1.0 uF, ± 20%, 50 V dc	1-900115-003	12954	DIROGSA50M
C8	Capacitor, fixed, electrolytic, 1.0 uF, ±20%, 50 V dc	1-900115-003	12954	DIROGSA50M
C9	Capacitor, fixed, electrolytic, 0.1 uF, ±20%, 50 V dc	1-900115-002	12954	DRIOGSA50M
C10	Capacitor, variable, ceramic, selected, 1.7 pF to 10 pF, 500 V dc (may be omitted)	1-900113-002	91293	9301
C11	Capacitor, variable, ceramic, 1.7 pF to 10 pF, 500 V dc	1-900113-002	91293	9301
C12	Capacitor, fixed, mica, selected, 5 pF nominal, ±5%, 500 V dc	1-900003-004	72136	DM15
C13	Capacitor, fixed, electrolytic, 1.0 uF, ±20%, 50 V dc	1-900115-003	12954	DIROGSA50M
C14	Capacitor, fixed, electrolytic, 0.1 uF, ±20%, 50 V dc	1-900115-002	12954	DRIOGSA50M
C15	Capacitor, fixed, electrolytic, 0.1 uF, ±20%, 50 V dc	1-900115-002	12954	DRIOGSA50M
C16	Capacitor, fixed, electrolytic, 0.1 uF, ±20%, 50 V dc	1-900115-002	12954	DRIOGSA50M
C17	Capacitor, fixed, electrolytic, 1.0 uF, ±20%, 50 V dc	1-900115-003	12954	DIROGSA50M
C18	Capacitor, fixed, electrolytic, 1.0 uF, ±20%, 50 V dc	1-900115-003	12954	DIROGSA50M
C19	Capacitor, fixed, electrolytic, 0.1 uF, ±20%, 50 V dc	1-900115-002	12954	DRIOGSA50M

Table 3-4. Parts List for Broadband Amplifier and Doubly Balanced Mixer Assembly, A1A4 (Cont.)

Ref. Desig.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
C20	Capacitor, fixed, electrolytic, 0.1 uF, ±20%, 50 V dc	1-900115-002	12954	DRIOGSA50M
C21	Capacitor, fixed, electrolytic, 0.1 uF, ±20%, 50 V dc	1-900115-002	12954	DRIOGSA50M
C22	Capacitor, variable, ceramic, 1.7 pF to 10 pF, 500 V dc	1-900113-002	91293	9301
C23	Capacitor, fixed, mica, selected, 15 pF nominal, ±5%, 500 V dc	1-900003-010	72136	DM15
C24	Capacitor, variable, ceramic, 1.7 pF to 10 pF, 500 V dc	1-900113-002	91293	9301
C25	Capacitor, fixed, electrolytic, 1.0 uF, ±20%, 50 V dc	1-900115-003	12954	DIROGSA50M
C26	Capacitor, fixed, ceramic, selected, 0.5 pF nominal, ±10%, 500 V dc (may be omitted)	1-900066-016	95121	MC
C27	Capacitor, fixed, plastic, 0.047 uF, ±20%, 250 V dc	1-900001-009	73445	C280AE
C28	Capacitor, fixed, mica, selected, 3 pF nominal, ±0.5 pF, 500 V dc (may be omitted)	1-900003-003	92136	DM15
C29	Capacitor, fixed, electrolytic, 1.0 uF, ±20%, 50 V dc	1-900115-003	12954	DIROGSA50M
C30	Capacitor, fixed, electrolytic, 0.1 uF, ±20%, 50 V dc	1-900115-002	12954	DRIOGSA50M
C31	Capacitor, fixed, electrolytic, 1.0 uF, ±20%, 50 V dc	1-900115-003	12954	DIROGSA50M
C32	Capacitor, fixed, mica, selected, 15 pF nominal, ±5%, 500 V dc	1-900003-010	72136	DM15
C33	Capacitor, fixed, electrolytic, 0.1 uF, ±20%, 50 V dc	1-900115-002	12954	DRIOGSA50M
C34	Capacitor, fixed, mica, selected, 10 pF nominal, ±5%, 500 V dc	1-900003-008	72136	DM15
C35	Capacitor, fixed, electrolytic, selected, 1.0 uF nominal, ±20%, 50 V dc	1-900115-003	12954	DIROGSA50M
C36	Capacitor, fixed, electrolytic, 0.1 uF, ±20%, 50 V dc	1-900115-002	12954	DRIOGSA50M
C37	Capacitor, fixed, mica, 1.0 pF, ±0.5 pF, 500 V dc	1-900003-001	72136	DM15
C38	Capacitor, fixed, electrolytic, 1.0 uF, ±20%, 50 V dc	1-900115-003	12954	DIROGSA50M
C39	Capacitor, fixed, electrolytic, 1.0 uF, ±20%, 50 V dc	1-900115-003	12954	DIROGSA50M
CR1	Diode, silicon, Vr=400 mV, If=2 mA	1-913026-003	03508	BD-3
CR2	Diode, silicon, Vr=20 V, If=100 mA	1-913074-001	80795	ITT244
CR3	Diode, silicon, Vr=20 V, If=100 mA	1-913074-001	80795	ITT244
CR4	Diode, silicon, Vr=75 V, If=10 mA	1-913007-001	03508	1N4148

Table 3-4. Parts List for Broadband Amplifier and Doubly Balanced Mixer Assembly, A1A4 (Cont.)

Ref. Desig.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
CR5	Diode, silicon, Vr=75 V, If=10 mA	1-913007-001	03508	1N4148
CR6	Diode, germanium, Vr=30 V, If=100 mA	1-913005-001	03877	1N273
L1	Inductor, fixed, 1000 uH, ±10%, 139 mA	1-906016-049	24759	DR1000
L2	Inductor, fixed, selected, 8 turns nominal	1-403690-001	88869	
L3	Inductor, fixed, 1000 uH, ±10%, 139 mA	1-906016-049	24759	DR1000
L4	Inductor, fixed, selected, 4 turns nominal	1-403283-001	88869	
L5	Inductor, fixed, 1000 uH, ±10%, 139 mA	1-906016-049	24759	DR1000
L6	Inductor, fixed, selected, 8 turns nominal	1-903283-007	88869	
L7	Inductor, fixed, 470 uH, ±5%, 180 mA	1-906032-045	43543	WEE470
L8	Inductor, fixed, selected, 4 turns nominal	1-403283-001	88869	
L9	Inductor, fixed, selected, 4 turns nominal	1-403283-001	88869	
L10	Inductor, fixed, 1000 uH, ±10%, 139 mA	1-906016-049	24759	DR1000
Q1	Transistor, silicon, PNP	1-958000-002	04713	2N3906-5
Q2	Transistor, silicon, NPN	1-958064-001	73445	A486
Q3	Transistor, silicon, PNP	1-958000-002	04713	2N3906-5
Q4	Transistor, silicon, NPN	1-958064-011	73445	A486
Q5	Transistor, silicon, PNP	1-958000-002	04713	2N3906-5
Q6	Transistor, silicon, NPN	1-958064-001	73445	A486
Q7	Transistor, silicon, PNP	1-958000-002	04713	2N3906-5
Q8	Transistor, silicon, NPN	1-958080-001	04713	2N4427
Q9	Transistor, silicon, NPN	1-958081-001	19197	SD1005-1
Q10	Transistor, silicon, PNP	1-958000-002	04713	2N3906-5
R1	Resistor, fixed, composition, 2.2 kilohm, ±5%, 1/4 W	1-945000-170	01121	CB2225
R2	Resistor, fixed, composition, 7.5 kilohm, ±5%, 1/4 W	1-945000-183	01121	CB7525
R3	Resistor, fixed, composition, 150 ohm, ±5%, 1/4 W	1-945000-142	01121	CB1515
R4	Resistor, fixed, composition, 3.9 kilohm, ±5%, 1/4 W	1-945000-176	01121	CB3925
R5	Resistor, fixed, composition, selected, 220 ohm nominal, ±5%, 1/4 W	1-945000-146	01121	CB2215
R6	Resistor, fixed, composition, 16 ohm, ±5%, 1/4 W	1-945000-119	01121	CB1605

Table 3-4. Parts List for Broadband Amplifier and Doubly Balanced Mixer Assembly, A1A4 (Cont.)

Ref. Desig.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
R7	Not used			
R8	Not used			
R9	Resistor, fixed, composition, 2.2 kilohm, ±5%, 1/4 W	1-945000-170	01121	CB2225
R10	Resistor, fixed, composition, 7.5 kilohm, ±5%, 1/4 W	1-945000-183	01121	CB7525
R11	Resistor, fixed, composition, 150 ohm, ±5%, 1/4 W	1-945000-142	01121	CB1515
R12	Resistor, fixed, composition, 3.9 kilohm, ±5%, 1/4 W	1-945000-176	01121	CB3925
R13	Resistor, fixed, composition, selected, 270 ohm nominal, ±5%, 1/4 W	1-945000-148	01121	CB2715
R14	Resistor, fixed, composition, 22 ohm, ±5%, 1/4 W	1-945000-122	01121	CB2205
R15	Resistor, fixed, composition, 2.7 kilohm, ±5%, 1/4 W	1-945000-172	01121	CB2725
R16	Resistor, fixed, composition, 3.3 kilohm, ±5%, 1/4 W	1-945000-174	01121	CB3325
R17	Resistor, fixed, composition, 150 ohm, ±5%, 1/4 W	1-945000-142	01121	CB1515
R18	Resistor, fixed, composition, 3.9 kilohm, ±5%, 1/4 W	1-945000-176	01121	CB3925
R19	Resistor, fixed, composition, selected, 270 ohm nominal, ±5%, 1/4 W	1-945000-148	01121	CB2715
R20	Resistor, fixed, composition, selected, 150 ohm nominal, ±5%, 1/4 W	1-945000-142	01121	CB1515
R21	Resistor, fixed, composition, 1.3 kilohm, ±5%, 1/4 W	1-945000-165	01121	CB1325
R22	Resistor, fixed, composition, 3.3 kilohm, ±5%, 1/4 W	1-945000-174	01121	CB3325
R23	Resistor, fixed, composition, 27 ohm, ±5%, 1/4 W	1-945000-124	01121	CB2705
R24	Resistor, fixed, composition, 3.9 kilohm, ±5%, 1/4 W	1-945000-176	01121	CB3925
R25	Resistor, fixed, composition, selected, 150 ohm nominal, ±5%, 1/4 W	1-945000-142	01121	CB1515
R26	Resistor, fixed, composition, selected, 1.0 kilohm nominal, ±5%, 1/4 W	1-945000-162	01121	CB1025
R27	Resistor, fixed, composition, 13 ohms, ±5%, 1/4 W	1-945000-117	01121	CB1305
R28	Resistor, fixed, composition, 100 ohm, ±5%, 1/4 W	1-945000-138	01121	CB1015
R29	Resistor, fixed, composition, 4.7 kilohm, ±5%, 1/4 W	1-945000-178	01121	CB4725
R30	Resistor, fixed, composition, 560 ohm, ±5%, 1/4 W	1-945000-156	01121	CB5615
R31	Resistor, fixed, composition, selected, 68 ohm nominal, ±5%, 1/4 W	1-945000-134	01121	CB6805

Table 3-4. Parts List for Broadband Amplifier and Doubly Balanced Mixer Assembly, A1A4 (Cont.)

Ref. Desig.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
R32	Resistor, fixed, film, 49.9 ohm, ±1%, 1/4 W	1-945016-068	72982	RN60D4990F
R33	Resistor, fixed, composition, 51 ohm, ±5%, 1/4 W	1-945000-131	01121	CB5105
R34	Resistor, fixed, composition, 56 ohm, ±5%, 1/4 W	1-945000-132	01121	CB5605
R35	Resistor, fixed, composition, selected, 680 ohm nominal, ±5%, 1/4 W	1-945000-158	01121	CB6815
R36	Resistor, fixed, composition, 430 ohm, ±5%, 1/4 W	1-945000-153	01121	CB4315
R37	Resistor, fixed, composition, 1.0 kilohm, ±5%, 1/4 W	1-945000-162	01121	CB1025
R38	Resistor, fixed, composition, 430 ohm, ±5%, 1/4 W	1-945000-153	01121	CB4315
R39	Resistor, fixed, composition, 470 ohm, ±5%, 1/4 W	1-945000-154	01121	CB4715
R40	Resistor fixed, composition, 10 ohm, ±5%, 1/4 W	1-945000-114	01121	CB1005
R41	Resistor, fixed, composition 2.4 kilohm, ±5%, 1/4 W	1-945000-171	01121	CB2425
R42	Resistor, fixed, composition, selected, 110 ohm nominal, ±5%, 1/4 W	1-945000-139	01121	CB1115
R43	Resistor, fixed, composition, 47 ohm, ±5%, 1/4 W	1-945000-130	01121	CB4705
R44	Resistor, fixed, composition, 1.0 kilohm, ±5%, 1/4 W	1-945000-162	01121	CB1025
R45	Resistor, fixed, composition, 8.2 kilohm, ±5%, 1/4 W	1-945000-184	01121	CB8225
R46	Resistor, fixed, composition, 4.7 kilohm, ±5%, 1/4 W	1-945000-178	01121	CB4725
R47	Not used			
R48	Not used			
R49	Not used			
R50	Resistor, fixed, composition, 16 ohm, ±5%, 1/4 W	1-945000-119	01121	CB1605
R51	Resistor, fixed, composition, 300 ohm, ±5%, 1/4 W	1-945000-149	01121	CB3015
R52	Resistor, fixed, composition, 300 ohm, ±5%, 1/4 W	1-945000-149	01121	CB3015
Z1	Mixer, doubly balanced	1-403411-001	88869	

Table 3-5. Parts List for Diode Switch Assembly, A1A6

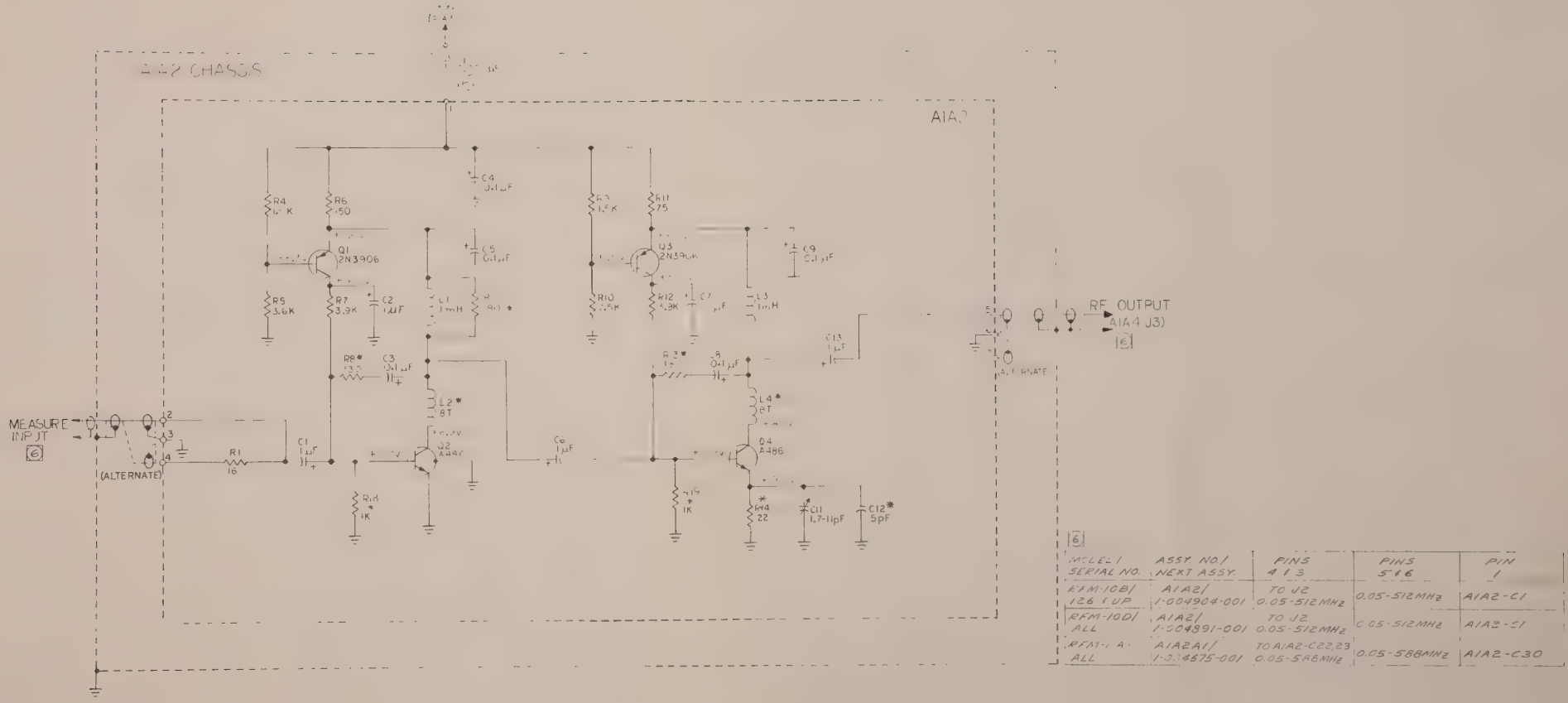
Ref. Desig.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
C1	Capacitor, fixed, feed-thru, 470 pF, ±20%, 500 V dc	1-900045-001	01121	FA5C4712
C2	Capacitor, fixed, feed-thru, 470 pF, ±20%, 500 V dc	1-900045-001	01121	FA5C4712
C3	Capacitor, fixed, ceramic, 0.01 uF, –20% +80%, 300 V dc	1-900012-003	72982	851Z5U103Z
C4	Capacitor, fixed, electrolytic, 2.2 uF, ±20%, 15 V dc	1-900115-005	12954	D2R2GS1D15M
C5	Capacitor, fixed, standoff, 470 pF, –0% +100%, 500 V dc	1-900044-001	01121	SS5D471W
C6	Capacitor, fixed, mica, 500 pF, ±5%, 500 V dc	1-900003-048	72136	DM15
C7	Capacitor, fixed, standoff, 470 pF, –0% +100%, 500 V dc	1-900044-001	C1121	SS5D471W
C8	Capacitor, fixed, mica, 500 pF, ±5%, 500 V dc	1-900003-048	72136	DM15
C9	Capacitor, fixed, ceramic, 0.01 uF, –20% +80%, 300 V dc	1-900012-003	72982	851Z5U103Z
C10	Capacitor, fixed, electrolytic, 2.2 uF, ±20%, 15 V dc	1-900115-005	12954	D2R2GS1D15M
CR1	Diode, germanium, Vr=30 V, If=100 mA	1-913005-001	03877	1N273
CR2	Diode, silicon, Vr=75 V, If=20 mA	1-913085-001	50273	1N3062
CR3	Diode, silicon, Vr=75 V, If=20 mA	1-913085-001	50273	1N3062
CR4	Diode, silicon, Vr=75 V, If=20 mA	1-913085-001	50273	1N3062
CR5	Diode, silicon, Vr=75 V, If=20 mA	1-913085-001	50273	1N3062
J1	Connector, jack, BNC, bulkhead	1-910005-001	11636	MIL-C3608
Q1	Transistor, N-channel, J-FET	1-958000-002	04713	2N5458
R1	Resistor, fixed, composition, 22 kilohm, ±10%, 1/4 W	1-945000-053	01121	CB2231
R2	Resistor, fixed, composition, 470 ohm, ±5%, 1/4 W	1-945000-133	01121	CB4715
R3	Resistor, fixed, composition, selected, (may be wire, tinned bus, 22 guage)	1-999001-007	04946	Conforms to QQ-W-343
R4	Not used			
R5	Resistor, fixed, composition, 10 ohm, ±10%, 1/4 W	1-945000-049	01121	CB1001
R6	Resistor, fixed, composition, 560 ohm, ±10%, 1/4 W	1-945000-034	01121	CB5611
R7	Resistor, fixed, composition, 1.2 kilohm, ±10%, 1/4 W	1-945000-038	01121	CB1221
R8	Resistor, fixed, composition, 1.2 kilohm, ±10%, 1/4 W	1-945000-038	01121	CB1221

Table 3-6. Code List of Manufacturers

The following code numbers are from the Federal Supply Code for Manufacturers Cataloging Handbook H4-2.

Code No.	Manufacturer	Address
01121	Allen-Bradley Co.	Milwaukee, Wis.
01295	Texas Instruments, Inc. Transistors Products Division	Dallas, Texas
03508	G. E. Semiconductor Products Division	Syracuse, N. Y.
03877	Transitron Electronic Corp.	Wakefield, Mass.
04713	Motorola Inc.	Phoenix, Ariz.
08730	Vemaline Products Co. Inc.	Wyckoff, N. J.
12954	Dickson Electronics Corp.	Scottsdale, Ariz.
13511	Amphenol Cadre	Los Gatos, Calif.
19197	Solid State Scientific Inc.	Philadelphia, Pa.
21604	Buckeye Stamping Co.	Columbus, Ohio
24759	Lenox-Fugle Electronics, Inc.	So. Plainfield, N. J.
29525	Hytronics Corp.	Pinellas Park, Fla.
32539	Mura Corp.	Great Neck, N. Y.
43543	Nytronics Inc.	Alpha, N. J.
49675	RCA Electronic Products Division	Camden, N. J.
56289	Sprague Electric Co.	North Adams, Mass.
71450	CTS Corp.	Elkhart, Ind.
72136	Electro Motive Mfg. Co.	Willimantic, Conn.
72699	General Instrument Corp.	Newark, N. J.
72982	Erie Technological Products Inc.	Erie, Pa.
73445	Amperex Electronics Co.	Hicksville, N. Y.
80795	ITT Semiconductors	New York, N. Y.
82389	Switchcraft Inc.	Chicago, Ill.
88869	Singer Instrumentation	Los Angeles, Calif.
91293	Johanson Mfg. Co.	Boonton, N. J.
95121	Quality Components Inc.	St. Marys, Pa.

Section IV
SCHEMATIC DIAGRAMS

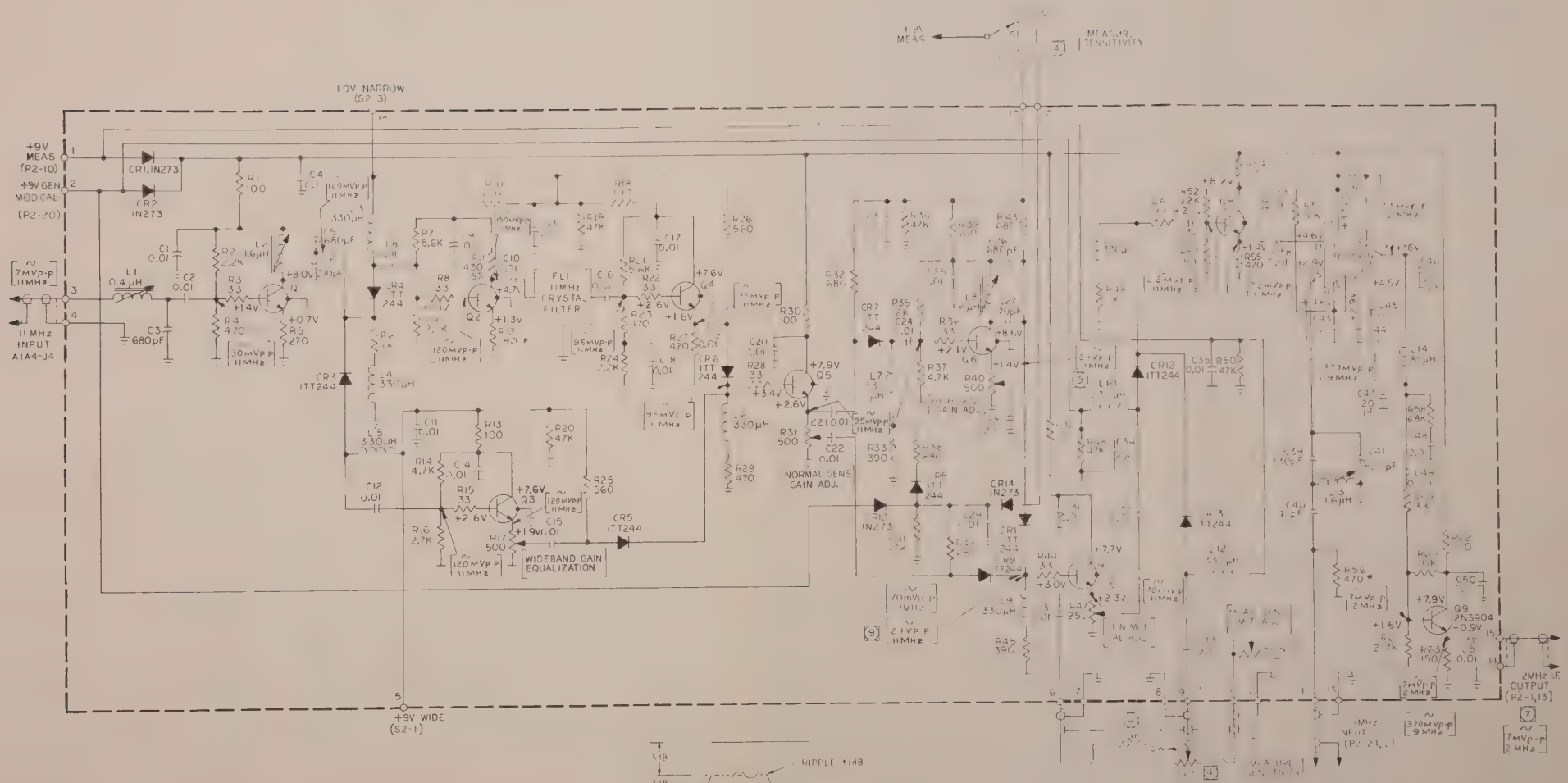


MODEL / SERIAL NO.	ASSY. NO. / NEXT ASSY.	PINS 4 & 3	PINS 5 & 6	PIN 1
RFM-10B / 126 & UP	A1A2 / 1-004904-001	TO J2 0.05-512MHz	0.05-512MHz	A1A2-C1
RFM-10D / ALL	A1A2 / 1-004991-001	TO J2 0.05-512MHz	0.05-512MHz	A1A2-C1
RFM-, A-	A1A2A1 / 1-3-4675-001	TO A1A2-C2323 0.05-586MHz	0.05-586MHz	A1A2-C30

LAST REF DESIGNATION USED			
C13	L4	Q4	R20
DESIGNATIONS OMITTED			
C10			R15,16,17

6. SEE TABULATION FOR ROUTING, REF DESG AND FREQUENCY RANGE
5. ALL DC VOLTAGES TAKEN WITH NO SIGNALS APPLIED.
4. VOLTAGES SHOWN WITHOUT TOLERANCES ARE TYPICAL.
3. PARTIAL REFERENCE DESIGNATORS SHOWN (A1A2 BOARD). FOR COMPLETE DESIGNATION, PREFIX WITH ASSY Nº "A1A2"; EXAMPLE "A1A2C3".
2. * DENOTES FACTORY SELECT VALUE; MAY BE OMITTED.
1. ALL RESISTOR VALUES ARE IN OHMS, ±5%, 1/4 W.

Figure 4-1. Schematic Diagram, Broadband Amplifier Assembly, A1A2, Dwg. No. 4-501355-001(C)



[9] SAME AS [7] EXCEPT MEASURE SENSITIVITY SWITCH SET AT HIGH.

8 * INDICATES FACTORY SELECTED VALUE.

[7] LEVEL PRESENT WITH 20m Vrms AT MEASURE INPUT JACK J2 AND MEASURE SENSITIVITY SWITCH SET AT NORMAL AND VERNIER FULL CCW.

6 ALL DC VOLTAGES TAKEN WITH NO SIGNALS APPLIED AND FM-10C MODE SWITCH IN EITHER MEAS, GEN MOD CAL, OR TONE GEN POSITION.

5 ALL VOLTAGES SHOWN WITHOUT TOLERANCES ARE TYPICAL.

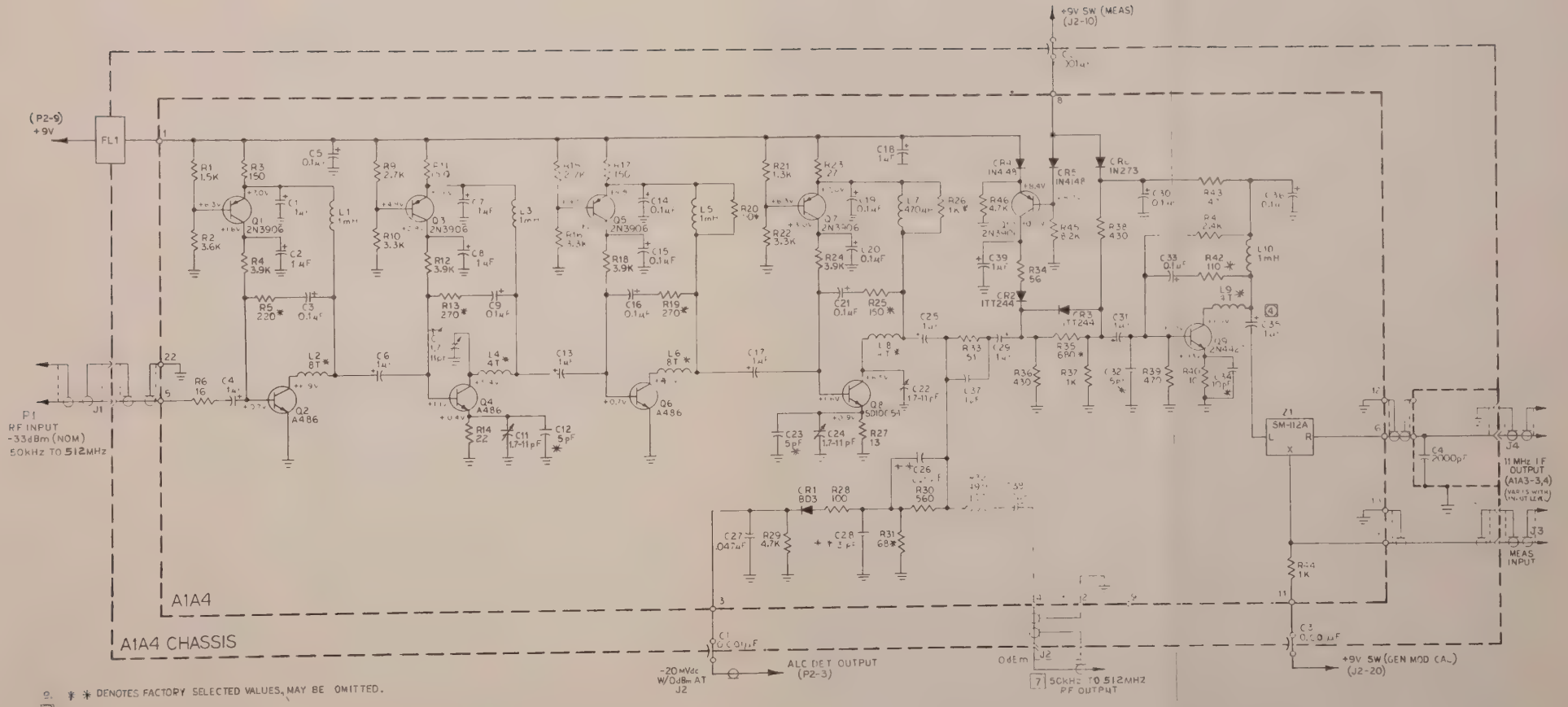
[4] FRONT PANEL COMPONENTS SHOWN FOR REFERENCE.

3 ALL TRANSISTORS ARE 2N5179.

2. ALL CAPACITOR VALUES ARE IN MICROFARADS.

1 ALL RESISTOR VALUES ARE IN OHMS, ±10%, 1/4 W.

Figure 4-2. Schematic Diagram, 11 MHz and 2 MHz IF Amplifier Assembly, A1A3, Dwg. No. 4-501364-001(D)



2. ✱ ✱ DENOTES FACTORY SELECTED VALUES, MAY BE OMITTED.

[8]

[7]

6. ALL DC VOLTAGES TAKEN WITH NO SIGNALS APPLIED. (DISABLE INT. TIME BASE)
5. VOLTAGES SHOWN WITHOUT TOLERANCES ARE TYPICAL.

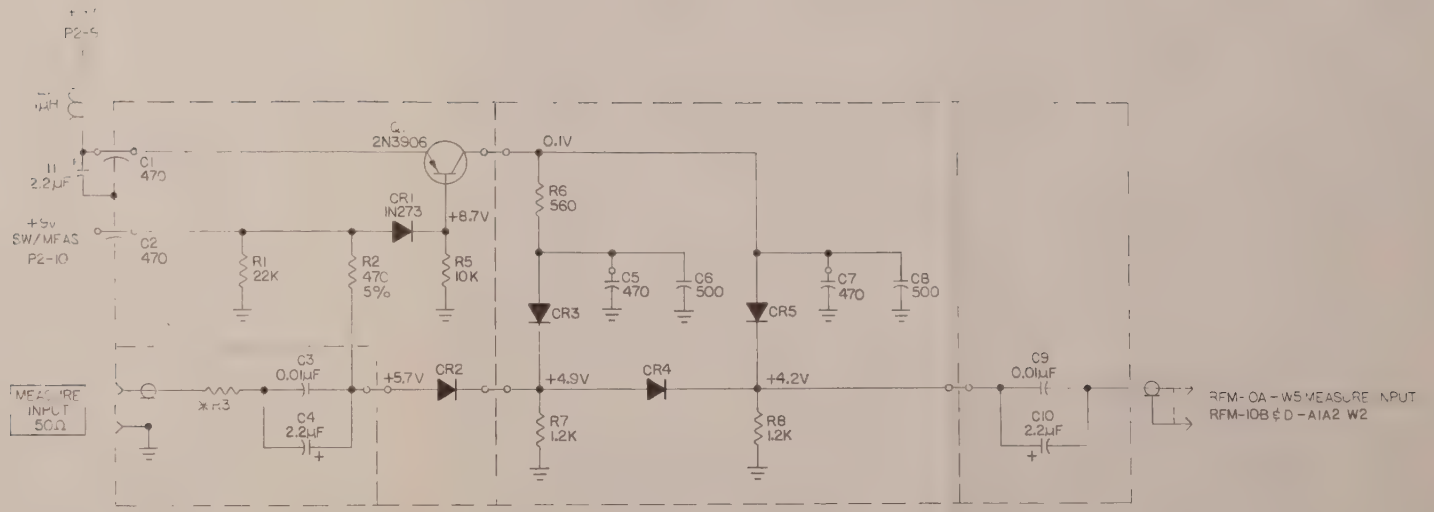
[4] TO BE LEFT OFF AT ASSEMBLY & INSTALLED DURING TEST.

3. PARTIAL REFERENCE DESIGNATORS SHOWN (A1A4 BOARD). FOR COMPLETE DESIGNATION, PREFIX WITH ASSY NO. "A1A4." EXAMPLE: A1A4C3.

2. ✱ DENOTES FACTORY SELECT VALUE.
1. ALL RESISTOR VALUES ARE IN OHMS, ±5%, 1/4W.

TABULATION BLOCK	
MODEL NO	SER. NO
RFM-10A	501 & UP
RFM-10B	126 & UP
RFM-10D	ALL

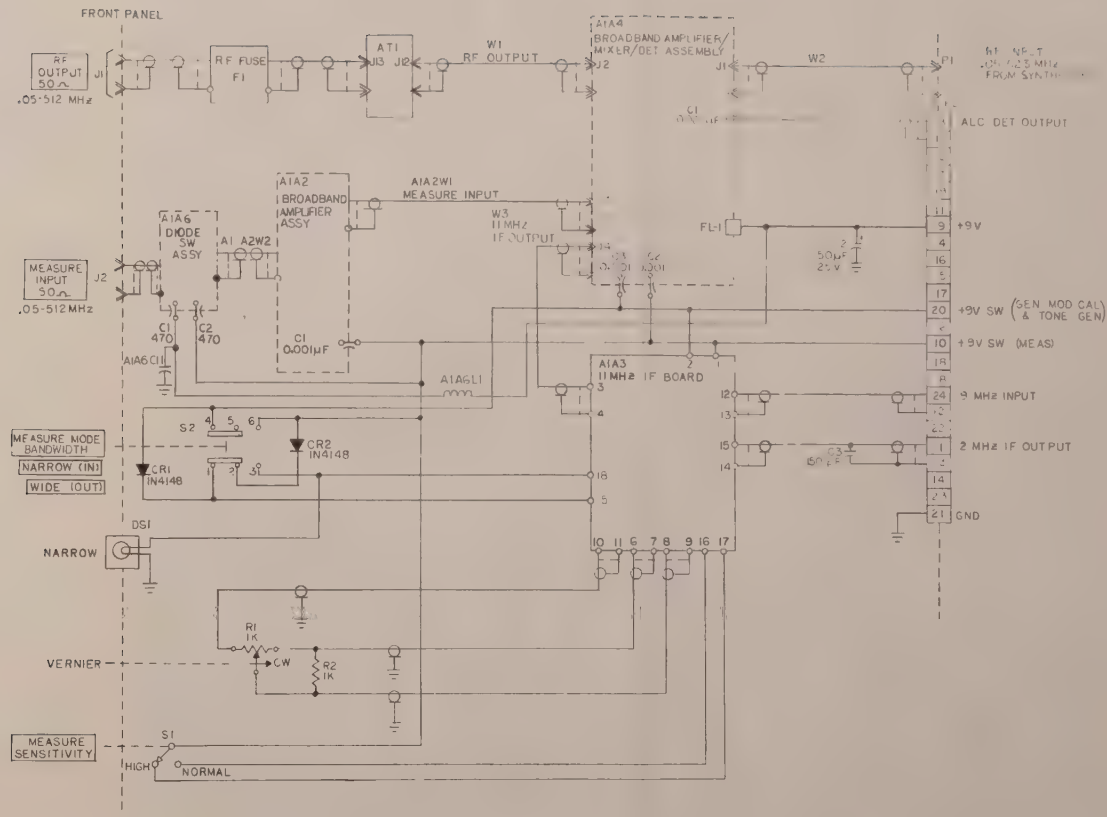
Figure 4-3. Schematic Diagram, Broadband Amplifier and Doubly Balanced Mixer Assembly, A1A4, Dwg. No. 4-501317-001(G)



(For use with serial numbers 201 and above)

5. ALL CAPACITORS ARE IN PICOFARADS.
4. * SELECTED AT TEST, NOMINAL JUMPER WIRE.
3. ALL VOLTAGES TAKEN IN MEASURE MODE.
2. ALL DIODES ARE IN3062.
1. ALL RESISTORS ARE IN OHMS, 1/4W, 10%.

Figure 4-4. Schematic Diagram,
Diode Switch Assembly, A1A6
Dwg. No. 3-501454-001



(For use with serial numbers 201 and above)

Figure 4-5. Wiring Diagram, Model RFM-10D Dwg. No. 4-501380-001(A)

APPENDIX A
BACKDATING INFORMATION
For Model RFM-10D
Serial Numbers 101 thru 200

This manual refers directly to serial numbers 201 and above. The following information is provided to adapt this manual for serial numbers 101 thru 200. Perform the following changes to the manual down to the effective serial number of your instrument.

Effective serial numbers: 101 thru 200.

Page 1-1: Paragraph 1.2 GENERAL

2nd paragraph: change to "three major assemblies" and delete "the Diode Switch Assembly, A1A6".

Paragraph 1.3.1 Generate Circuitry

Delete the 3rd paragraph "Diode switches . . . . J2"

Paragraph 1.3.2 Measure Circuitry

1st Paragraph: Delete "The diode switches on assembly A1A6 are in the (meas) position and allow the signal to pass to A1A2."

Paragraph 1.3.3 Gen Mod Cal Circuitry

Delete the last paragraph "Diode switches . . . . J2"

Page 1-2: Paragraph 1.3.4 Tone Generator Circuitry

Delete the last paragraph "Diode switches . . . . J2"

Page 1-3/1-4: Figure 1-1. Detailed Block Diagram

Delete the A1A6 Assembly and replace with a straight line from J2 to A1A2-2 (ground to A1A2-3). Add a 3 dB pad between A1A4J3 and junction of A1A4R44 and A1A4Z1-X.

Page 2-6: Paragraph 2.5.8 Measure Input Sensitivity and Calibration

Delete steps b and c.

Page 3-17: Table 3-5. Parts List for A1A6

Delete the entire table.

Page 4-9/4-10: Figure 4-4. Schematic Diagram, A1A6

Delete the drawing

Page 4-11/4-12: Figure 4-5. Wiring Diagram, Model RFM-10D

Delete the A1A6 Assembly, A1A6C11 and A1A6L1 and replace with a straight line.

Effective serial numbers: 101 thru serial numbers suffixed with 04288.

Page 3-14: Table 3-4. Parts List for A1A4

Change R5 as follows:

R5	Resistor, fixed, composition, selected, 150 ohm nominal, ±5%, 1/4 W	1-945000-142	01121	CB1515

Page 3-15: Table 3-4. Parts List for A1A4

Change R19 as follows:

R19	Resistor, fixed, composition, selected, 330 ohm nominal, ±5%, 1/4 W	1-945000-150	01121	CB3315

Change R20 as follows:

R20	Resistor, fixed, composition, selected, 1 kilohm nominal, ±5%, 1/4 W	1-945000-162	01121	CB1025

Change R25 as follows:

R25	Resistor, fixed, composition, selected, 220 ohm nominal, ±5%, 1/4 W	1-945000-146	01121	CB2215

Page 4-7/4-8: Figure 4-3. Schematic, A1A4

Change
R5 to 150*
R19 to 330*
R20 to 1K*
R25 to 220*

Effective serial numbers: 101 thru serial numbers suffixed with 03351.

Page 3-3: Table 3-2. Parts List A1A2

Change L4 as follows:

L4	Inductor, fixed, selected, 4 turns nominal	1-403283-001	88869	

Effective serial numbers: 101 thru 130

Page 3-3: Table 3-2. Parts List for Broadband Amplifier Assembly, A1A2

Change C2 to:

Capacitor, fixed, electrolytic, 120 uF, ±20%, 15 V dc	1-900115-001	12954	D120GSD15M

Change R2, R3, to:

Resistor, fixed, composition, selected, 300 ohm nominal, ±5%, 1/4 W	1-945000-149	01121	CB3015

Page 3-4: Table 3-2. Parts List for Broadband Amplifier Assembly, A1A2 (Cont.)

Change R14, to:

Resistor, fixed, composition, 15 ohm, ±5%, 1/4 W	1-945000-118	01121	CB1505

Below R19, Add:

R20	Resistor, fixed, composition, selected, 270 ohm nominal, ±5%, 1/4 W	1-945000-148	01121	CB2715

Page 3-5: Table 3-3. Parts List for A1A3

Change C2 as follows:

C2	Capacitor, fixed, plastic, 0.01 uF, ±20%, 250 V dc	1-900001-001	73445	C280AE

Change C6 as follows:

C6	Capacitor, fixed, mica, 270 pF, ±5%, 500 V dc	1-900003-041	72136	DM15

Change C7 as follows:

C7	Capacitor, fixed, plastic, 0.01 uF, ±20%, 250 V dc	1-900001-001	73445	C280AE

Change C8 thru C24 as follows:

Capacitor, fixed, plastic, 0.01 uF, ±20%, 250 V dc	1-900001-001	73445	C280AE

Page 3-6: Table 3-3. Parts List for A1A3

Change C27 as follows:

C27	Capacitor, fixed, mica, 270 pF, ±5%, 500 V dc	1-900003-041	72136	DM15

Change C29 thru C38 as follows:

Capacitor, fixed, plastic, 0.01 uF, ±20%, 250 V dc	1-900001-001	73445	C280AE

Change C39 as follows:

C39	Capacitor, fixed, mica, 330 pF, ±5%, 500 V dc	1-900003-043	72136	DM15

Change C40 as follows:

C40	Capacitor, fixed, mica, 100 pF, ±5%, 500 V dc	1-900003-030	72136	DM15

Change C46 and C47 as follows:

	Capacitor, fixed, mica, 120 pF, ±5%, 500 V dc	1-900003-032	72136	DM15

Change C48 as follows:

C48	Capacitor, fixed, plastic, 0.01 uF, ±20%, 250 V dc	1-900001-001	73445	C280AE

Page 3-7: Table 3-3. Parts List for A1A3

Change C49 as follows:

C49	Capacitor, fixed, plastic, 0.001 uF, ±20%, 250 V dc	1-900001-030	73445	C280AE

Change C51 as follows:

C51	Capacitor, fixed, plastic, 0.01 uF, ±20%, 250 V dc	1-900001-001	73445	C280AE

Page 4-3/4-4: Figure 4-1. Schematic Diagram, Broadband Amplifier Assembly, A1A2

At the junction of A1A2-4 and R1, Add: A resistor, R2* 300, with the other end to ground.

At the junction of C1 and R1, Add: A resistor, R3* 300, with the other end to ground.

At the junction of C8 and L4, Add: A resistor, R20 270, with the other end to the junction of L4 and Q4-C.

Change C2, to: 120 uF

Change R14, to: 15

Page 4-5/4-6: Figure 4-2. Schematic Diagram, 11 MHz and 2 MHz IF Amplifier Assembly, A1A3

At the junction of CR3 and R6, Add: A capacitor, C7 0.01, with the curved side to the junction of C5 and C6.

Change C49, to: 0.001

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Prepared By: Rick Schultz	Approved By: [signature]
Issued By: Jim Steinau	Issue Date: 10/19/93

CHANGE NOTICE SUMMARY

Revision	Reason for Change	Date of Change

34734